RAILROAD GAZETTE

FRIDAY, MARCH 29.

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Contributions.

Indicator Cards and Compounding.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Will you kindly inform me from what compound locomotive, by whom, and on what day were the indicator cards taken shown in your columns, as card No. 6, in an editorial article, Feb. 22? I would like to further know the speed in revolution, boiler pressure, scale of spring, and what proportion of the original the illustrated card gives. I would also like the same data for card No. 3. There exists in my mind a great doubt whether these cards were taken at the speeds mentioned. Can you tell me what kind of speed indicators were used? Observers counting revolutions have many sins to answer for. Doubt is raised in my mind by these cards, on account of the extremely low back pressure, as compared with cards from similar compound locomotives, which show a back pressure of as much as 20 lbs., at 48 miles per hour, while that shown in the cards above mentioned is not more than 4 lbs. I am ready to accept the challenge thrown out, if such it can be called, as to the comparison of cards with double valve non-compounds, when you can give us something authentic to compare with. Not only this, but am ready to put a non-compound four-valve engine in competition with any compound now running, or yet to be constructed, as to economical performances when working heavy fast expresses or fast freight trains, either in regard to water consumed per horse-power, or with reference to ability to handle fast freight trains on time. GEORGE S. STRONG.

[Our correspondent will find an almost identical card illustrated in *Engineering*, April 13, 1888, page 361, taken from the Worsdell compound locomotive. This reference gives nearly all the data asked for. Our correspondent must remember that the compound locomotive has been much improved, both in the valve gear itself and in the method of its operation, within the past few years. There is no reason to doubt the back pressure given when one remembers that no attempt is made to cut off short in the low-pressure cylinder. It is the necessary short cut-off in the common locomotive which acts disastrously on the back pressure and compression line of the indicator card. In the compound locomotive this evil is removed by reason of allowing the low-pressure cylinder to work at full stroke at high speeds. This is the practice of the English runner on the compound locomotive now running on the Pennsylvania, as stated in a former issue of this paper. At full stroke the radial as well as the link gears have better exhaust openings and far less compression than when cutting off short. Our correspondent's surprise at the small back pressure is another evidence of the indirect value of compounding, and it goes to show us that even if the value of double expansion, *per se*, should prove to be nothing, which is not at all likely, many incidental advantages would result from the use of two expansions. In regard to our correspondent's challenge to compare indicator cards on a fair basis, we shall be most pleased to do so, and as soon as the Pennsylvania issues cards for the public from the compound. This will furnish conditions that will admit of an indisputable comparison. While there is every possibility of the best American locomotives equaling, and possibly exceeding, the compound locomotives in economical fuel consumption, when the fuel is of ordinary American quality, yet the higher pressures of the compound (*i. e.*, 175 lbs.), together with the superior freedom of exhaust openings at high speeds, will, in part at least, make up for the smaller grates. We hope our readers who have taken indicator cards at high speeds from the typical American engine will send them for publication, if they are of such form as to throw some light upon the question of back pressures in fast locomotives.—EDITOR RAILROAD GAZETTE.]

Cost of Service as the Basis of Rates.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Some three years ago I made some calculations as to the cost of transportation by a small road, to ascertain whether cost of service could be used exclusively as a basis for making rates, and the result seemed to justify a belief in its practicability. If too much had to be estimated and too much assumed, the fact suggests the information needed in railroad reports. Surely the only reasonable cost basis for making rates is the average shown for a year's business, though a better one might be had if reports were made for the half years, ending March 31 and Sept. 30, because, with all Northern roads at least, the cost of service is greater in the winter than in the summer months. Could the cost of transporting each particular (no play on the word) passenger or shipment be known it would not do to make charges accordingly, for that would cause insufferable discrimination and uncertainty in charges. One person might occupy the only vacant seat in a train, while to accommodate another would require an additional car, and one shipment might furnish use for a car that would otherwise go in that direction empty while another would require the special movement of a car both ways; yet it would not do to charge differently for each and such a course would no more be expected than it might be expected of a merchant to charge a higher price for goods sold by a high-salaried clerk, or because the customer required much of his time, than if sold by the porter and promptly, although the difference in the cost of the transaction might be material to him.

For the traffic of the year 1885 I undertook to distinguish the expenses as terminal, extra and general, which, it may be supposed, are the same, whether the transportation is for long or short distances, and as movement expenses, which depend on the distance of carriage.

In maintenance of way, the terminal expenses were approximated by ascertaining the excess per mile of labor only, on terminal sections, over that of other main line track sections supporting equal service.

In passenger traffic it was found that a train making 21 stops required 30 per cent. more fuel than one making 8 stops, running at greater speed between the same points, the trains being about the same weight and the engines being of the same class; therefore, considering the average number of stops of all trains, 30 per cent. of the cost of fuel for locomotives, less than used by locomotives in yards, was allotted to terminal expenses. I then had for

Terminal Expenses.—Agents, clerks, laborers and dispatchers; watchmen and other station expenses; enginemen and firemen in yard service; fuel for locomotives in yard service; cost of fuel for the stops of local trains; labor on track and frogs and switches for stations.

Extra and General Expenses.—Advertising, incidentals and legal expenses; loss and damage, stationery and printing; superintendents, telegraph and other general expenses.

Movement Expenses.—Baggage masters, conductors and brakemen; car cleaning and lighting; motive power, less terminal as above; maintenance of way, less terminal as above; maintenance of cars.

The sum of the terminal, extra and general expenses divided by the number of passengers carried, showed the amount of such expenses for each passenger, and the movement expenses divided by the passengers one mile showed the cost mile.

Supposing that for the last year this analysis of the expense of the passenger traffic of a railroad shows that the cost of carrying was one cent per passenger-mile, that the terminal, extra and general expenses were 10 cents per passenger, equivalent to the cost of carrying each passenger 10 miles, and that the average above the average cost, and which yielded a satisfactory revenue was 25 per cent. of the cost; then to make rates add 10 miles to the actual distance in each case, and allowing for the fact that much of the transportation was by excursions, and under special circumstances, which made the cost less than the average; make the addition for risk and profit, say 30 per cent., and the rates would be as follows:

For	1 mile,	charge for	11 miles at 1.3 cents			$0.14
	5	"	15	"	"	0.20
	10	"	20	"	"	0.26
	100	"	110	"	"	1.43
	500	"	510	"	"	6.63

This seems more reasonable than the practice of charging a certain rate per mile for actual distances, whether long or short.

For the accommodation of persons who travel much and wish to avoid the annoyance of buying tickets for each trip of unequal and uncertain distances, mileage books might be made like those now in use, and for a certain number of miles to be used in the same way, but with additional coupons bound together, which, say for the supposed road to represent 10 miles each; and one of them to be cancelled and sent to the general office for each trip, being marked by conductor with numbers of stations between which used. The books might be arranged for average trips of 4 miles, by making the regular mileage part for 800 miles with 200 10-mile coupons added, and could then be sold for $36.40 each, with a provision that the unused 10-mile coupons would be redeemed at 13 cents each. Should the book be used in trips averaging 5 miles there would be 40 coupons to redeem for $5.20, and the 800 miles travel would have cost $31.20, or 3.9 cents per mile. For 8-mile trips the mileage might be for 800 miles with 100 10-mile coupons and sold for $23.40, and if used in 16-mile trips there would be 50 coupons to redeem for $6.50 and the 800 miles travel would have cost $16.90, or 2.11 cents a mile; or if used in 50-mile trips the cost would be $12.48, or 1.56 cents a mile. There could be no legal objection to making these the only mileage books issued, and one advantage would be that the road could suffer no loss by their being transferable.

In freight traffic the same division of expenses was made as in passenger traffic except for stops of local trains. It appeared that for two days' business of a local train and a through freight train with engines of the same class and running over the same line, the expense for trainmen and fuel for the local train was 50 per cent. more per ton mile than for the through train, and as of the whole tonnage less than nine per cent. was in less than car-load freight handled through freight depots, and assuming that the ton mileage was in the same proportion, 25 per cent. of 9 per cent. of the expenses for trainmen and fuel, less that known to be for yard service, and one-third of the expenses for agents, clerks and laborers and other station expenses, were allotted to the terminal expenses of less than car-load freight. This extra expense for stopping local trains and handling freight at way stations is of course a very uncertain quantity, but I do not think the allowance too high.

The tonnage for the year 1885 of the road mentioned was in leading articles and in the proportions as follows, and for which the classification given opposite is proposed:

	Proportion.	Average car load.	Class.
Lumber	115	Over 15 tons.	E
Grain	87	" 15 "	D
Flour	7	" 15 "	D
Anthracite coal	142	" 15 "	E
Bituminous coal	65	" 15 "	E
Iron ore	156	" 15 "	F
Pig iron	116	" 15 "	F
Railroad iron	49	" 15 "	E
Stone and sand	29	" 15 "	E
Cotton	5	" 10 "	B
Iron castings	32	" 10 "	B
Machinery and ag'l implements	12	" 10 "	B
Petroleum	3	" 10 "	A
Live stock	32	" 10 "	A
Other car-loads	63	" 10 "	C
Less than car-loads	87	" 4 "	1 to 5

Making six classes for car-load freight and five classes for less than car-load, using multiples of the first-class according to present practice.

Since we do not know the ton mileage of each commodity we assume, simply to show how the rates could be made if we had this information, that the ton mileage is the same as the tonnage proportions given above, and multiply each proportion by this rate for its class to obtain the cost of actual movement of each class, then to grade the classes according to the risk and character of service required for each, add certain per cents which are arbitrary. We know that in hauling iron ore or rough stone there is very little risk. A car may break down because over loaded, and perhaps there is more risk of loss so occasioned in this kind of freight than other kinds, but there is no chance for much loss of the lading. With live-stock, there is always great risk and prompt movement is required. So with rough bark, although it may be shipped in car-loads of the same weight as cotton, its value is much less and the chance of loss is in every way so much less that it can be profitably carried at a much less rate.

If the grading per cents. yield in the aggregate less or more than the increase over the cost which is desired, they can be proportionately increased or decreased.

Supposing that these divisions of expenses show that the cost of moving freight by a railroad was for the last year four mills a ton mile, that the terminal, extra and general expenses were 16 cents a ton for car loads and 30 cents a ton for less than car loads; that the average charge above cost was 50 per cent. of the cost; and that the average car load for all freight was 12 tons. Then allowing 11 tons as the light weight of cars, the average cost of moving each loaded car would have been 4.8 cents a mile, the whole weight being 23 tons, and for car loads of 15 tons the cost would have been $\frac{4.8 \times 26}{23} = 5.43$ cents a car mile or 3.62 mills per ton mile.

For car loads of 10 tons the cost would have been 4.39 mills and for 4 tons 7.82 mills per ton mile.

The terminal, extra and general expenses would be equivalent to the cost of hauling 40 miles, for both car loads and less.

By making the following table, it appears that the grading per cents yield 52⅓ per cent., and therefore must be reduced 5 per cent. to produce the desired increase of 50 per cent. above cost.

Class.	Min. C. L.	Ton-miles.	Cost. Rate.	Cost. Amount.	Grading. Per cent.	Amount.	Per cent. to be added to cost rate.
F	Tons.	27.2	3.62	9.85	20	1.97	19
E	15	40.0	3.62	14.48	40	5.79	38
D	15	9.4	3.62	3.40	60	2.04	58
C	15	6.3	4.39	2.77	60	1.66	58
B	10	4.9	4.39	2.15	80	1.72	76
A	10	3.5	4.39	1.54	100	1.54	95
	10	8.7	7.82	6.80	100	6.80	95
	1 to 5			40.99		21.52	

Then we have rates to be used for constructive distances

made by adding 40 miles to actual distance, as follows—per 2,000 lbs.:

Class.	Cost.	Add.	Rates.	One mile.	Ten miles	100 miles	500 miles.
			Mills.	Cts.	Cts.	Cts.	
F	3.62	19	4.31	18	22	60	$2.33
E	3.62	38	5.00	21	25	70	2.70
D	3.62	58	5.72	23	29	80	3.09
C	4.39	58	6.94	28	35	97	3.75
B	4.39	76	7.74	32	39	108	4.18
A	4.39	.95	8.56	35	43	120	4.62
1 to 5	7.82	95	15.25	63	76	214	8.24

The less than car-load freight might be rated as to quantity of each class which may be loaded in a car by itself or with other freight, as it is ordinarily shipped, and graded according to risk.

As the movement cost is 7.82 mills ton-mile for four-ton car-loads, it would be 6.67 mills ton-mile for five-ton car-loads, etc.:

Class.	C. L. Eqv.	Cost.	Add.	Rate.	One mile.	Ten miles	100 miles	500 miles.
5	5	6.67	80	1.20	49	60	1 68	6.49
4	5	6.67	100	13.34	55	67	1.87	7.20
3	3	9.73	100	19.46	80	97	2.72	10.51
2	2	13.56	100	27.12	111	136	3.80	14.64
1	2	13.56	120	29.83	122	149	4.18	16.11

Evidently undue attention has been given to the elaboration of classifications for less than car-load freight, to the neglect of weightier matters, quite as if a "tariff is a tax," which should be laid so as to produce the least complaint, instead of standing for honest charges for actual services.

The reduction in the cost of carrying freight has been because of increased car loads more than for any other reason, and this because the quantities of certain articles moved, such as coal, lumber and grain, have made it convenient to ship in the largest car-loads, rather than because proper encouragement to do so has been given in the rates. This is particularly true in the East and South.

Other departments of railroads are managed with the utmost economy, various items of expense of more or less importance are recorded with exactness, and nice calculations are made to show even the quantity and cost of oil, tallow and waste used per locomotive, car and ton-mile, but the commercial departments, because the cost of specific transportation cannot be known, make rates for the earnings, by no method or rule, unless it is to get all they can, with such variations as conscience and competition may dictate, "and hope," pleading the "baby act" that "the whole traffic will amount to more than the cost of service," which, taken altogether, suggests the character of a beggarly miser, infatuated with gambling, and staking all he can beg and save on chances.

If it is expected that railroads shall earn some profit on the operations of each year, and that charges for transportation shall be as low as will afford a reasonable profit to the carrier, then it is necessary to charge according to the average cost of each kind of service, so that one shall not be done at a loss and thus require an exorbitant charge for another.

With uniform classification under which to record the classes, the ton-mileage of each of the five or six car-load classes and the tonnage and ton-mileage of the whole less than car-load freight can be shown with reasonable practicability. And so can the separate terminal and movement expenses, if given the same care and attention as is now given to the less important statistics, with sufficient accuracy for the proper making of rates.

The extra and general expenses are needed separately to learn the cost of new, special or temporary traffic only, as all continual or permanent traffic should share in all general expenses in due proportion.

The reports now required by the Inter-state Commerce Commission show much information, interesting to investors and as census statistics, which might possibly be exchanged for information which would better help to determine what are reasonable rates. AVE.

Railroad Terminology.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It seems to me that the time has come for a better understanding about some of our transportation terms. We are all more or less cloudy about the meaning of many words daily upon our lips. The great business of carriage of goods and passengers by railroads is certainly deserving of a more accurate nomenclature. Of course, no one man can possibly give definitions which will be accepted or, indeed, pass criticism, but it may be well, in spite of this, to call public attention to one or two words at the start. These can be discussed by your readers, the definitions modified, the list added to, and thus a beginning be made. I offer, then, for criticism the following:

A Cut Rate.—In either freight or passenger traffic, a rate lower than the published tariff then in force, made presumably to a favored shipper, trade or city, usually secret.

A Reduced Rate.—A rate made publicly by giving to the Inter-state Commission and to the associated roads (if bound by an agreement to maintain certain tariffs) the regular 10 days' notice. Applicable to all to whom the original tariff rate would apply.

It will be noticed that these definitions would confine the word cut" entirely to illegal and therefore probably disreputable transactions. For example, referring to the recent action of the Burlington & Northern in naming a 10 cent or 7½ cent rate on flour from Minneapolis to Chicago, by giving official notice to the Inter-state Commission and to the Inter-state Association, it would be incorrect to call this procedure "cutting the rate"; it should be styled "reducing the rate." If, on the other hand, this or any other road should contract with Pillsbury, say, to carry his flour at 7½ cents, while quoting the tariff 12½ to other millers, that would be cutting the rate. To take another example: If Nebraska corn could be carried to Baltimore by a study of junction points through which a combination of rates could be made yielding a total lower than the rate via Chicago, this (supposing the parts of the combination to be public rates would not be technically cutting the rate according to our definition, though it might amount to that by a piece of sharp practice. For the remedy would not be an open reduction of the rate via Chicago, but a readjustment which would prevent any combination of intermediate rates being less than the through.

Rebate.—An allowance made from the published tariff rates without public notice to some favored shipper or consignee. Usually secret.

Overcharge.—A payment made to certain shippers in cases where more than the published tariff rate has been charged through any error or misunderstanding.

Here again the same principle appears of confining the first-named word to illegal payments. I know it is the business of a would-be dictionary maker to be sure of his ground, nevertheless I am not sure of these last definitions. An example will show what I mean. The all-rail rate on salmon from Columbia River to New York city was fixed last year at $1 per 100 lbs. The discount for shipments, via the lakes, was not agreed upon (all the particulars) at time salmon started, so all cars were charged $1, and all consignees were given back 10 cents per hundred within certain dates when via the lakes. Was this a rebate or an overcharge? I favor the latter, though the case is not clear.

I hope some railroad man will carry this subject further. Ill-defined terms mean confusion of thought, and, as I said before, the business of railroading is important enough to demand accurate terms and careful thinking. JUDEX.

Graham's Draft Rigging.

Apropos of the discussion of draw-bar attachments at the Western Railway Club last week, an account of which is given in another column, we illustrate a most excellent device in use on the Pennsylvania, a patent for which has been applied for. This rigging was invented by Mr. J. A. Graham, who is foreman at the Fort Wayne shops of the Pennsylvania system, and has been adapted by the Pennsylvania to its freight cars, class X C and K D, and adopted as a standard therefor.

Fig. 1 shows this device in position and attached to a Janney coupler. It also shows the manner in which the draft timbers butt against the body bolster of the car. Fig. 2 shows a plan of this arrangement with all parts in position. Fig. 3 is an end view and half section, showing the keys and braces in position. Fig. 4 shows the draw-bar spring bracket; fig. 5 the follower, fig. 6, washers, fig. 7, keys, fig. 8, straps, fig. 9, draft-pin, draw-bar bolt and striking plate.

A description of the construction and operation of this draw-bar attachment may be stated as follows: The draw-bar *A* has a buffer stop upon it which is located normally 1⅜ in. from the striking plate *N*, which is placed on the side and bottom of the end sill, as shown in fig. 1, and in detail in fig 9. This striking plate is used on all cars equipped with this draft rigging, whether the wrought draw-head or the Janney coupler is used. The dead blocks shown, however, are only used with wrought-iron link-and-pin draw-heads In case of repairs, where the automatic coupler is substituted for the link-and-pin draw-head, the dead blocks are removed.

The striking plate is made of a $6\frac{7}{16} \times 4\frac{7}{16} \times \frac{5}{8}$ in. angle iron, weighing $58\frac{4}{10}$ lbs. per yard. This striking plate is secured to the end sill by two horizontal lag screws, ¾ in. in diameter, and two vertical bolts, 1⅛ in. in diameter, as shown in figs. 1, 2, 3 and 9. The striking plate is recessed into the end sill as shown, making it flush with the face of the sill. The vertical bolt *J*, which secures the striking plate, also passes down through the draft timber *H* and the draw-bar stirrup *I*, and is secured by two nuts, as shown at *J*, fig. 1. These bolts as well as the other vertical bolts, which secure the draft timbers to the centre sills of the car, have large washers *M* of cast iron, placed under the head and recessed into and flush with the floor of the car. These washers have projections on opposite sides which are let into the floor-beams and prevent their rotation, as well as the rotation of the bolt-heads which fit into them, as shown at *M*, fig. 6. The object of these washers is to facilitate repairs, and from the construction it can be seen that the vertical bolts can be readily removed from above without disturbing the floor. It has been the aim in this design not only to decrease the probability of repairs, but to reduce the labor incident thereto, when repairs become necessary.

In order to protect the ends of the draft timbers, where the draw-bar passes between them at the end, a strap of iron 4 in. × ¼ in., shown in fig. 1, has been arranged to pass under the draft timber, upon its inner face, and across the top, as shown in fig. 3. It will be seen that the draw-bar has a metal bearing in the strap and timbers on all sides. In action under buffing blows the end of the draw-bar presses against the follower *D*, which slides freely in the bracket *E*, as shown in fig. 1. A corresponding follower *d*, passing through a corresponding bracket *e*, presses against the spring under pulling strains. When these followers and springs are put in position, the bolt *B* passing through these parts, draws them all tightly together by means of a key and washer, as shown at *F*. It will, therefore, be clearly understood that there is no lost motion in this gear.

The manner of securing the draw-bar brackets to the draft sill *H* and car sills, is as follows: Between the centre sills, which are 4 in. × 7½ in., is inserted a piece of timber, 5½ in. × 7½ in. This timber is rabbetted on to the body bolster, butting against the end sill. This is held in position by ⅝ in. bolts passing through it and the centre sills. These bolts are not intended to act in any way but as binders. The draw-bar spring brackets *e* and *E* are recessed into the draft timbers and filling pieces, and are bolted to the draft timbers by ⅞ in. bolts *K* with washers under the head and nut, as shown in figs. 1, 2 and 3. The draft timbers are prevented from spreading by cross-straps *h*, secured by the vertical bolts, *J J*, and shown in fig. 8. Longitudinal bottom straps, *G G*, are placed on the bottom of the draft sills, and secured thereto by the vertical bolts, and by lips which are recessed into and turned over the draft timbers. These longitudinal straps are notched, as shown in fig. 8, to receive the draw-bar spring brackets. In order to insert or remove the key *F* in the draft bolt, the draw-bar spring brackets are notched to allow this key to pass out vertically. A recess is also made in the filling piece between the sills to allow this to be done. The draft timbers are keyed to the centre sills by two large cast-iron keys, *L*, 3½ × 2 in., as shown in figs. 1, 3 and 7. The draft timbers are also rabbetted out for the end sill, as shown in fig. 1.

The manner in which the pulling and buffing strains are resisted by this gear is as follows: When the pulling strain increases the draft spring closes up, and the washer and key *F* in the end of the draft bolt *B* bear against the draw-bar spring bracket. This draw-bar spring bracket, being recessed into the draft timbers and into longitudinal straps *G G*, which are attached to the draft timbers by five bolts *J J* each, the strain is transferred directly to the draft timbers in a manner which prevents any distortion of the parts. Any failure of the draft timber sidewise is prevented by the cross straps *h h h*. Because the longitudinal strap *G* is notched on to the draw-bar spring bracket *E*, the bearing of this bracket as well as that of *C*, is available to assist in resisting the heavier as well as the lighter pulling strains. This bracket *E* resists all of the lighter pulling strain until the key and washer come to a bearing upon the bracket *e*.

The strain having been transmitted to the draft timbers, the method of securing the draft timbers to the sills comes next in order of importance. The large cast-iron key, shown at *L*, figs. 1 and 7, through which a bolt, passes, furnishes a large bearing and great security against the end movement of the draft timber. This in itself is quite sufficient to resist the pulling strain. But in addition thereto there are seven vertical bolts in each timber, ¾-in. in diameter, which pass through the centre sills, draft timbers and straps below. Still further, the draft timbers are rabbetted out and bear against the end sills as well as the draw-bar straps. Besides the foregoing, the draw-bar spring brackets are recessed into and have a large bearing, fore and aft, on the filling pieces, as shown at the top of the spring bracket *E* and *e*, fig. 1.

In buffing, the lesser blows are taken by the draft springs, which are held in position and the blow transmitted to the centre sills by the bracket, in the same manner as described for the pulling strain. In addition to this, however, the draw-timbers have a bearing against the body-bolster of the car, as shown in fig. 1, which causes the momentum of the trucks to be transmitted directly to the buffers. The heavier blows are received by the striking plate *N*, from the buffing horn on the draw-head, as shown in fig. 1. The object of the centre filling-piece now becomes apparent. It backs up the centre sill opposite the buffer horn and striking plate, and transmits a large proportion of the heavy buffing blows to the body bolster, and thus to the sills of the car. The centre sills being placed close together in this design and the striking plate extending across their ends, on the outside of the end sills, enables them almost directly to resist the buffing blows of the draw-head horn on the striking plate and end sill. There are many other interesting features in this draw-bar attachment which render the illustrations well worthy of examination by our readers. Further comment on this device will be found in the editorial columns.

Train Accidents in February.

COLLISIONS.

REAR.

5th, on Delaware, Lackawanna & Western, at York, N. Y., an empty engine ran into the rear of a freight train, and, together with several cars, was thrown over an embankment and wrecked.

5th, on Boston & Lowell, at Somerville, Mass., a freight train ran into a derailed switching engine, killing the engineer of the latter.

5th, near Pacific Junction, Ia., a Chicago, Burlington & Quincy passenger train was run into by a closely following Kansas City, St. Joseph & Council Bluffs freight train, damaging the engine and two rear coaches.

6th, on Montgomery & Eufala, at Union Springs, Ala., a passenger train ran over a misplaced switch and into the rear of a freight train standing on a side-track, wrecking an engine, caboose and several cars.

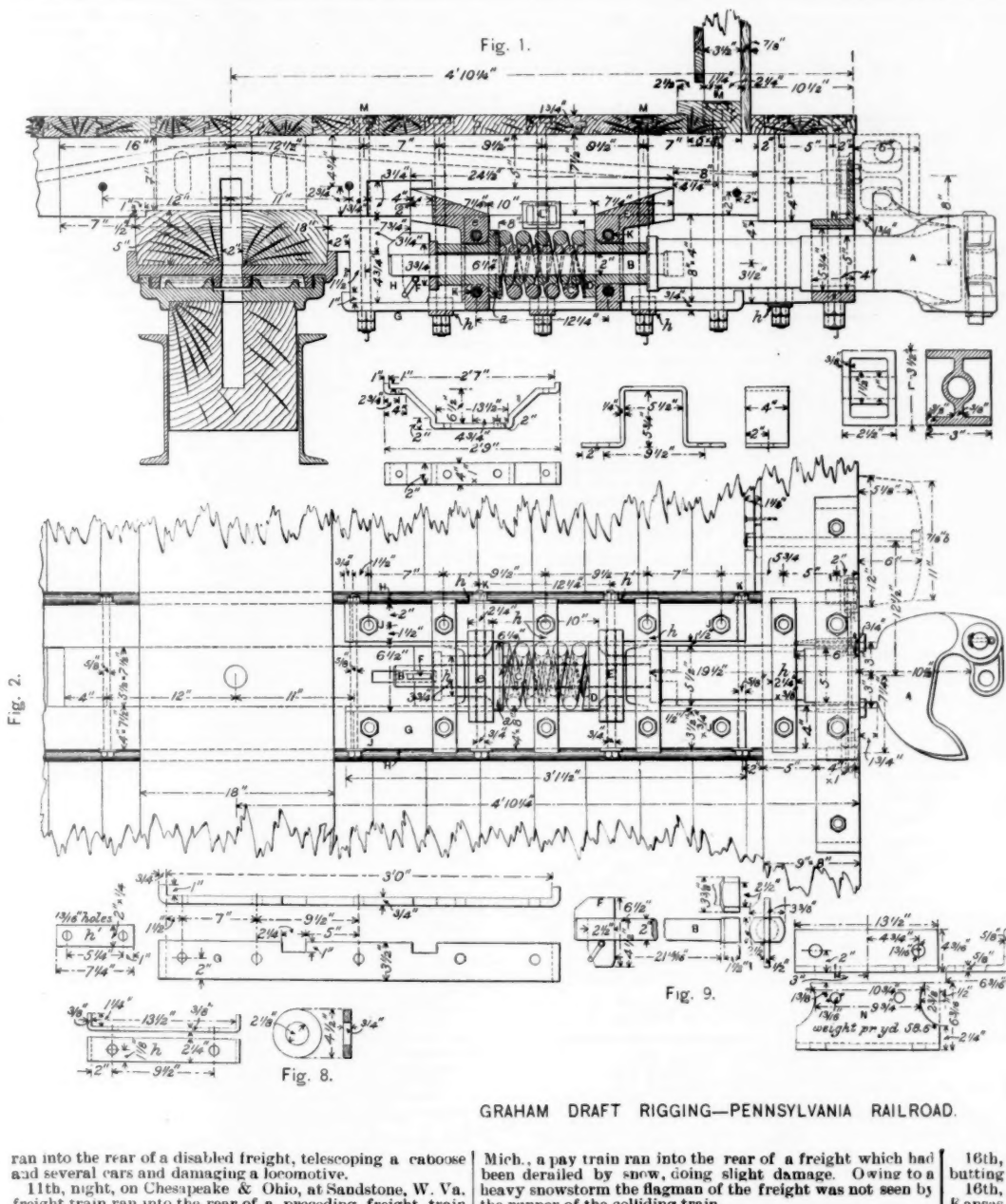
6th, on Southwestern, near Geneva, Ga., a freight train ran into the rear of a preceding freight, wrecking an engine and 9 cars.

7th, on New York Central & Hudson River, near Lockport, N. Y., a freight train ran into the rear of a preceding freight. Engine, caboose and several cars damaged. A heavy snowstorm prevailed at the time.

8th, on Raleigh & Gaston, near Raleigh, N. C., a passenger train ran over a purposely misplaced switch and into some box cars, doing considerable damage and injuring several trainmen.

8th, on Delaware, Lackawanna & Western, near Newark, N. J., a freight train ran into the rear of a switching freight, wrecking an engine and several cars.

9th, on Illinois Central, near Milan, Tenn., a freight train



GRAHAM DRAFT RIGGING—PENNSYLVANIA RAILROAD.

ran into the rear of a disabled freight, telescoping a caboose and several cars and damaging a locomotive.

11th, night, on Chesapeake & Ohio, at Sandstone, W. Va. freight train ran into the rear of a preceding freight train on a side-track, damaging engine, caboose and several cars, and killing a brakeman. Both trains were to enter the side-track, and the foremost one had left the switch set for the other to follow it. There was a dense fog at the time.

13th, on Pittsburgh, Fort Wayne & Chicago, near Lafayette, O., a fast passenger train ran into the rear of a freight train entering a siding. The caboose and 3 cars were overturned, wrecked and burned up. Engineer hurt by jumping.

15th, on Burlington & Missouri River, at Ashland, Neb., a freight train ran into the rear of a preceding freight. Locomotive and caboose damaged, and several drovers asleep in the latter were injured

16th, on Peoria, Decatur & Evansville, near Indianapolis, Ind., a freight train ran into the rear of a preceding freight on a trestle, doing considerable damage.

16th, night, on Cincinnati, New Orleans & Texas Pacific, at tunnel No. 17, near Oakdale, Tenn., a freight train ran into the rear of a preceding freight, damaging several cars. The wreck took fire from the caboose stove, and was burned up, together with nearly the whole of the wooden lining of the tunnel. The fire was not extinguished for several days. This accident is referred to more fully in the *Railroad Gazette* of March 22. The collision is attributed to the carelessness of the engineer of the second train, who disregarded a signal.

19th, on New York Central & Hudson River, near Corfu, N. Y., a freight train ran into the rear of a preceding freight, doing considerable damage and injuring a brakeman. There was a heavy snowstorm at the time.

19th, on Chesapeake & Ohio, near Lowmoor, Va., freight train descending a grade broke in two, and the rear portion ran into the forward one, damaging several cars

20th, on Cincinnati, Indianapolis, St. Louis & Chicago, near Lafayette, Ind., a passenger train ran into the rear of a freight train on a sharp curve. The caboose, which was thrown from the track and overturned, immediately took fire and was consumed.

20th, on Chicago, Burlington & Quincy, at Galesburg, Ill., a freight ran into a preceding freight which had stopped at the entrance to the yard. The caboose and 1 car were crushed and 1 brakeman pinned in the wreck. A fire soon started, which burned the wrecked cars and killed the brakeman.

21st, on Southern Pacific, at Glauris, Cal., a freight train ran into the rear of a preceding freight, disabling the engine and demolishing the caboose.

21st, on Boston & Albany, in Brookline, Mass., a freight train ran over a misplaced switch and into some box cars standing on a side track. The latter were pushed off the end of the track and into a dwelling house, which was partially demolished.

21st, on Maine Central, near Enfield, Me., a freight train broke in two and the rear portion ran into the forward one, damaging several cars.

21st, on Elgin, Joliet & Eastern, at Spaulding, Ill., a coal train ran into some empty cars standing on the main track, wrecking a dozen of them.

22d, on Duluth, South Shore & Atlantic, at Stoneville, Mich., a pay train ran into the rear of a freight which had been derailed by snow, doing slight damage. Owing to a heavy snowstorm the flagman of the freight was not seen by the runner of the colliding train.

22d, night, on Pennsylvania road, at Bordentown, N. J., freight train ran into the rear of a preceding freight, damaging engine, caboose and one car. These were set on fire and destroyed.

23d, on Maine Central, near Boyd's Siding, Me., passenger train running at about 30 miles an hour ran over a misplaced switch and into some freight cars standing on a side track. The mail and baggage cars were completely wrecked and immediately took fire. The fireman and 2 mail clerks were burned to death, and 2 other trainmen injured.

23d, on Southern Pacific, near Marathon, Tex., three closely following freight trains ran together, the foremost one having unexpectedly come to a stop. Slight damage was done.

24th, a. m., on Pennsylvania, at New Brunswick, N. J., a west bound freight train, stopped with its caboose near the Raritan River bridge, was run into by a following freight, wrecking engine, caboose and 7 cars, all of which were burned up. The accident occurred on the freight track, which is not operated under the block system.

26th, on Louisville, New Orleans & Texas Pacific, near Slaughter, La., a freight train broke in two and the rear portion ran into the forward one, wrecking 3 cars. A barrel of whisky in one of the cars was broken and the leakage accidentally took fire, consuming a portion of the wreck.

27th, on Mobile & Girard, near Seales, Ala., a freight train broke in two, the rear portion collided with a following construction train, damaging an engine and several cars.

BUTTING.

3d, on Chesapeake & Ohio, at Tuckahoe, Va., butting collision between two freight trains, damaging both engines and several cars. Fireman slightly hurt. The engineer of the westbound train misunderstood his order, which made Tuckahoe the meeting point, and would have gone to the next station had he not been forcibly stopped.

5th, on Chicago, Milwaukee & St. Paul, near Ixonia, Wis., butting collision between two heavy freight trains, piling up both engines and several cars in a bad wreck. Two trainmen slightly hurt.

6th, on Ohio River Road, at Williamstown, W. Va., butting collision between two freight trains, damaging both engines and one car.

11th, on Pennsylvania road, at Reading, Pa., butting collision between two freight trains, due to a mistake in signals, damaging both locomotives One trainman hurt.

12th, near Aubrey, Tex., butting collision between Texas & Pacific and Missouri, Kansas & Texas freight trains, doing considerable damage. One trainman injured.

13th, on Chicago, Burlington & Quincy, at St. Augustine, Ill., butting collision between a passenger train and a fast stock train, wrecking both engines and several cars of each train. An express messenger was fatally injured. The accident is attributed to the freight engineer's watch being three minutes slow.

15th, on Chicago, Burlington & Quincy, near Keokuk, Ia., butting collision between a passenger train and a yard engine. Both locomotives and the express and baggage cars were badly wrecked. A passenger in a sleeping car was hurled against a seat and seriously injured.

16th, on Terre Haute & Indianapolis, at Bridgeport, Ind., butting collision between two freight trains in a dense fog.

16th, on Kansas City, Wyandotte & Northwestern, in Kansas City, Mo., butting collision between a freight train and a yard engine hauling some passenger cars, damaging both engines and several coaches. It is said that, owing to icy track, the freight could not be controlled.

16th, on East Tennessee, Virginia & Georgia, at Rome, Ga., butting collision between two switching locomotives, damaging both. An engineer was hurt by jumping.

22d, 7 p. m., on Shenandoah Valley road, near Bentonville, Va., a passenger train ascending a grade ran into a car-load of steel rails which had escaped control at Bentonville and run down the grade. The engine was badly broken about the front and was overturned. The engineer was injured by jumping, and the fireman was badly scalded. Two cars were derailed and an express messenger injured.

23d, on New York, Chicago & St. Louis, at Townsend, O., butting collision between two freight trains, wrecking both engines and half a dozen cars. Two trainmen hurt.

24th, on East Tennessee, Virginia & Georgia, near Knoxville, Tenn., butting collision between two freight trains on a sharp curve, demolishing both engines and 8 cars. One trainman killed, 2 injured.

26th, on Cleveland, Lorain & Wheeling, near Flushing, O., butting collision between two freight trains, wrecking both engines and 10 cars.

27th, on Central of Georgia, near Macon, Ga., butting collision between a freight train and an empty engine. Both locomotives were badly damaged.

CROSSING AND MISCELLANEOUS.

2d, on Boston & Maine, at Lynn, Mass., a freight train ran into an empty passenger train switching across the main track, stripping a combination smoker and baggage car off its trucks and slightly damaging the freight locomotive.

6th, on Pennsylvania road, at Burlington, N. J., engine of passenger train switching across the main track was struck by a freight train, wrecking both engines.

10th, at San Bernardino, Cal., an Atchison, Topeka & Sante Fe freight train ran into a California Southern freight switching across the main track, wrecking two engines and about a dozen cars.

13th, on New York Central & Hudson River, in the yard at the Grand Central Station, New York City, a New York, New Haven & Hartford passenger train, which had just left the station, was struck at the side by an engine coming out of an engine house. The smoking car was derailed, but no person injured. It appears that the switchman in the tower threw the switch, which had no detector-bar, while the passenger train stood over it, or before it had wholly passed from it, and gave a clear signal to the engine approaching on the side-track.

15th, on Alabama Great Southern, at Livingston, Ala., a freight train ascending a grade broke in two and the rear portion ran back into the head of a freight switching across the main track, wrecking 4 cars. Two tramps stealing a ride were killed.

19th, on Wisconsin Central, in Chicago, Ill., an outgoing passenger train ran into the side of a freight train switching across the main track and moving in the same direction, doing considerable damage. Engineer and fireman killed and 2 other trainmen and 2 passengers injured.

27th, on Southern Pacific, near Sandy Fork Siding, Tex.,

a passenger train ran into a construction train, damaging an engine, 10 flat cars and a bridge.

DERAILMENTS.

DEFECTS OF ROAD.

4th, on Portland & Willamette Valley, near Middleton, Or., the rear car of a passenger train was thrown from the track by a broken rail and completely overturned, injuring 4 passengers.

5th, on Boston & Lowell, at Somerville, Mass., the engine of a switching freight train was derailed, presumably by a defective switch-rail, and thrown over on its side in such a manner as to imprison the runner in the cab; a train immediately ran into the wreck (see collisions) and the engineman was killed.

5th, on Cleveland & Pittsburgh, near Irondale, O., engine and 8 cars of a freight train were thrown from the track by a broken rail and damaged. Two trainmen hurt.

5th, on Louisville, New Albany & Chicago, near Quincy, Ind., 5 cars and the caboose of a freight train were thrown from the track by a broken rail and wrecked. One trainman killed, one fatally and another severally injured.

6th, on New York, Lake Erie & Western, near Lackawaxen, N. Y., 7 cars of a freight train were derailed at a switch.

9th, on Mobile & Girard, near Inverness, Ala., a passenger train was thrown from the track by a broken rail. The rear car was overturned, injuring several passengers.

11th, on Pennsylvania, near Nagney, Pa., an accommodation train was thrown off the track by a broken rail, doing some damage, injuring 2 trainmen and several passengers.

12th, on Louisville & Nashville, at Camio, Ala., a passenger train was derailed by a broken frog.

13th, on Illinois Central, near Delaware, Ia., a bridge gave way under a freight train, and 11 cars of live stock went down into the stream in a bad wreck, killing many of the animals.

13th, on Southern Pacific, near Caliente, Cal., engine and 2 cars of a freight train broke through a bridge.

19th, on Northern Pacific, near Hauser Junction, Idaho, several cars of a passenger train were thrown from the track by a broken rail.

24th, on Lake Shore & Michigan Southern, near Jefferson, O., engine and 6 cars of a freight train derailed and ditched by a broken rail. A brakeman was injured.

25th, on Illinois Central, near Freeport, Ill., a freight train struck a broken rail and 17 cars were thrown from the track over an embankment. A man in charge of a carload of horses was injured.

25th, on East Tennessee, Virginia & Georgia, near Lumber City, Ga., the engine of a freight train was derailed by a defective switch and partially demolished an adjacent building.

27th, on Central of Georgia, near Eufala, Ala., 9 freight cars and a coach of a mixed train broke through a trestle and were wrecked. The coach rolled down an embankment and caught fire, but the flames were soon extinguished. One passenger injured.

28th, on Chesapeake & Ohio, near Cannelton, W. Va., 2 cars of a passenger train derailed by a broken rail. Two cars on a sidetrack were demolished, and one passenger was injured.

DEFECTS OF EQUIPMENT.

2d, on Louisville & Nashville, near Holmes' Gap, Ala., 7 cars of a freight train were derailed by the breaking of an axle, and ditched.

2d, on Boston & Maine, at Salem, Mass., freight train derailed by a broken wheel under the tender.

3d, on Central of Georgia, near Griswold, Ga., 12 cars of a freight train were ditched by the breaking of an axle and badly wrecked.

5th, on Lehigh Valley, near Slatington, Pa., several cars of a freight train were derailed and wrecked by a draw bar pulling out and falling upon the track.

6th, on Southern Pacific, near Eldridge, Tex., the engine of an east-bound passenger train was derailed by a broken flange while crossing a 15-ft. trestle, causing the structure to give way. The locomotive, baggage car, one coach and two sleepers went down with it and several passengers were slightly injured.

8th, on Baltimore & Ohio, at Suter's, Pa., a car of a freight train was derailed by a broken axle and thrown against a freight train moving in the opposite direction, doing considerable damage and injuring 2 trainmen.

9th, on Denver & Rio Grande, near Soldier Summit, Utah, as a freight train was descending a heavy grade the coupling between the tender and first car gave way, severing the air brake hose and rendering the train unmanageable. The locomotive was derailed at a curve and, together with 17 cars, went into the ditch. Engineer badly hurt.

12th, on Union Pacific, near Horse Creek, Wyo., engine and several cars of a passenger train were derailed by a broken flange and overturned, slightly injuring a trainman.

13th, on Indianapolis & St. Louis, at Toledo, O., several cars of a freight train were derailed by a broken axle and ditched.

14th, on New York, Lake Erie & Western, near Gulf Summit, N. Y., a truck under a car in a freight train broke and 3 cars were derailed and ditched and several others damaged.

27th, on New York & New England, near New Britain, Conn., engine and 8 cars of a freight train derailed while running 25 miles an hour. It is stated that the driving wheel tires were badly worn and caused derailment at a frog.

NEGLIGENCE IN OPERATING.

3d, on St. Louis & San Francisco, at Springfield, Mo., a switch engine was derailed and overturned, killing 5 trainmen and a drover and injuring several other trainmen. It is stated that the accident was due to the high speed at which the engine was running.

5th, on Baltimore & Ohio, near Newark, O., 2 cars of a passenger train were thrown from the track by a rail which had been left insecurely spiked at a point where track repairs were in progress.

5th, on Rome, Watertown & Ogdensburg, near Lewiston, N. Y., several cars of a freight train were backed off the end of a spur track and fell down an embankment.

7th, on New York Central & Hudson River, at the Grand Central Station, New York City, a passenger train in making a flying switch was not controlled and ran at some speed into a butting-post, demolishing the front platform of the forward car.

28th, on East Tennessee, Virginia & Georgia, near Jesup, Ga., 2 cars of a passenger train were derailed at a trestle where sectionmen had left a rail insecurely spiked.

UNFORESEEN OBSTRUCTIONS.

5th, on Ohio & Mississippi, at East St. Louis, Ill., passenger train ran into a drove of cattle, and was partially derailed.

18th, on New York Central & Hudson River, near Tonnawanda, N. Y., freight train derailed by snow.

19th, on Buffalo, Rochester & Pittsburgh, at Bliss, N. Y., a car in a freight train was derailed by snow.

19th, on Clarendon & Pittsford, at West Rutland, Vt., locomotive derailed by ice at a crossing and overturned.

22d, on Duluth, South Shore & Atlantic, at Stoneville, Mich., two locomotives and the foremost car of a freight train were derailed by snow.

28th, on Savannah, Griffin & North Alabama, near Newnan, Ga., a passenger train was derailed by running over a cow.

UNEXPLAINED.

3d, on Chicago & Alton, near McMullen, Mo., a stock train was derailed at a bridge. Six cars were thrown off the bridge and twelve over an embankment. A number of cattle were killed in the wreck.

4th, on Rome, Watertown & Ogdensburg, in Watertown, N. Y., the rear engine of a double-header freight train was derailed at a street crossing.

8th, on Louisville & Nashville, in Nashville, Tenn., a car in a freight train was derailed on a trestle, tipped off and wrecked.

9th, on Central of Georgia, near Tomsboro, Ga., eight cars of a freight train were derailed and wrecked.

11th, on Bradford, Bordell & Kinzua, near Rew City, Pa., engine of a passenger train was derailed and overturned, badly injuring the engineer and fireman.

13th, on Chesapeake & Ohio, near Kanawha Falls, W. Va., several cars of freight train derailed and wrecked in a tunnel, blocking the road for 12 hours.

13th, on Chesapeake & Ohio, near Howard, W. Va., 2 cars of a freight train derailed as it was pulling out of a sidetrack.

15th, on Louisville, New Albany & Chicago, near Paoli, Ind., a passenger and a freight car in a mixed train were derailed and went over an enbankment, where the wreck caught fire and was consumed. Five passengers injured.

17th, on New York Central & Hudson River, near Aikens, N. Y., caboose of a freight train was derailed and knocked down several telegraph poles. On reaching a frog the wheels were thrown back on the track.

18th, on East Tennessee, Virginia & Georgia, near O'Brien, Ga., 16 cars of a freight train were derailed and wrecked.

19th, on Pittsburgh, Fort Wayne & Chicago, at Hobart, Ind., freight train derailed.

19th, on Chesapeake & Ohio, at Howard, W. Va., two cars of a freight train derailed while pulling out of a side track.

20th, on Savannah, Griffin & North Alabama, at Senoia, Ga., several cars of a mixed train were derailed and damaged.

21st, on New York Central & Hudson River, near Jordan, N. Y., 12 cars of a freight train were derailed.

21st, on Western New York & Pennsylvania, near Tuscarora, N. Y., 3 cars of a coal train were derailed and wrecked.

21st, on Georgia Pacific, at Mapleton, Ga., freight train derailed.

22d, on Maine Central, near Mattawamkeag, Me., freight train derailed and partially wrecked.

23d, on Louisville & Nashville, near Calera, Ala., 17 cars of a freight train were derailed and badly wrecked.

23d, on Northern Central, near Ralston, Pa., a passenger train was derailed, one of the coaches going over an embankment. Fifteen passengers slightly and the conductor dangerously injured.

25th, on Buffalo, Rochester & Pittsburgh, near Maplewood, N. Y., engine and one car of a freight train were derailed.

26th, on Chicago, Burlington & Quincy, at Burlington, Ia., a loaded freight car was derailed on the bridge across the Mississippi River, breaking several girders and rendering the structure unsafe for several hours.

26th, on Talbotton road, at Talbotton, Ga., engine of a mixed train was derailed and wrecked.

28th, on Montgomery & Eufala, near Montgomery, Ala., freight train derailed.

OTHER ACCIDENTS.

11th, on New York Central & Hudson River, near Williams Bridge, N. Y., nearly all the windows of a New York, New Haven & Hartford passenger train were broken by an explosion of nitro-glycerine near the track. Several passengers were slightly injured by the shattered glass. The nitro-glycerine had been frozen, and was lying upon a wheelbarrow for the purpose of being thawed out. The explosion is said to have been caused by the passage of the train jarring the wheelbarrow.

15th, on New York Central & Hudson River, near Marcellus, N. Y., connecting-rod of engine of a freight train broke and demolished the cab. A brakeman in jumping from the locomotive was fatally injured.

15th, on Philadelphia & Reading, near Centre Valley, Pa., the boiler of a locomotive hauling a freight exploded, killing the engineer and fireman and slightly injuring a brakeman. The force of the explosion, which was downward, tore away the crown sheet, displaced a large quantity of ballast and twisted the rails out of shape.

20th, on Columbus & Western, near Birmingham, Ala., engine of passenger train broke a connecting-rod.

22d, on Illinois Central, at Dimmick, Ill., the crown-sheet of the locomotive of a freight train blew out, seriously scalding 3 trainmen.

A summary will be found in another column.

Draw-Bar Rigging for Freight Cars.

At the last meeting of the Western Railway Club this subject was discussed.

Mr. SCHROYER said: I am one of the committee appointed by the Master Car Builders' Association to prepare a report on carrier irons and the length of the draw bar. These questions enter into the question of the draw-bar rigging. I have made on the blackboard a little sketch which will show the construction of a draught rigging which we are using on the Chicago & Northwestern as our standard draught rigging (see *Railroad Gazette* of Feb. 1, 1889). From the results that we are having with it, I consider it equal to any of the patent arrangements that I know of in service to-day, as far as simplicity of construction is concerned, case of repairs and the number of pieces.

Our draw-irons are constructed with three lugs, cast around the bolt, which answer the purpose of stops. We found that these castings were driven back and consequently the lugs were either broken or tended to split the draught timbers. After some consideration we increased the thickness of the draught timber. The timbers are tied together at the bottom edges by the yoke and carrier iron. The draught timber is 5⅛ in. in thickness by 7¾ in. in width, and 4½ in. in thickness at the point where the stop castings are let into the draught timber. The front stop casting is probably 6 or 7 in. in length by 6¼ in. in width, 1 in. thick at the front end and 2½ in. in thickness at the back end. The back stop casting is about 9 in. in length by 6¼ in. in width, 1 in. in thickness at the rear end and 2¼ in. in thickness at the front end. The follower plate carrier irons are ½ in. by 2 in., about 16 in. in length, punched on the ends to receive the bolts, which pass through the front and back stop castings. The pocket is made of ⅝ in. × 4 in. iron, 10 in. in length from the back end of the draw-bar to the inside place on the back strap pocket, and is 6¼ in. in width. The spring and follower plates are held in position by a bolt passing through the rear plate of the follower pocket and into the rear plate of the draw-bar, and is held by a split key. A cast-iron thimble is put in over the bolt, which holds the spring. It is a matter of some considerable importance that these sizes be retained, and that the neck of the draw-bar be made to correspond to these sizes. This is especially important where the Janney type of draw-bar is used, because you can readily see that there is a great difference in the use of the Janney type of draw-bar on a rigid beam car, and on a swing motion car, and for that reason the committee considers this a question of very great importance, and I am now fitting up a car with the Janney draw bars, and I am going to try it on curves, our trucks being swing-motion trucks.

The question of deadwood castings also enters into the draw-bar rigging. We use on our cars a deadwood block. We consider the deadwood block a matter of great importance as an element of safety. This commission is supposed to recommend the adoption of a deadwood casting, but we are not satisfied with any of the known forms, and as a member of the committee, I would like to say that we will gladly entertain any suggestions that may be made by members of the association or inventors on the question of a cushioned buffer. I have always contended that the use of the Janney type of draw bar would necessarily bring with it the use of a deadwood casting or block.

At the rear ends of our draught timbers, we put in filling blocks, so that we have virtually a continuous timber from one end of the car to the other, so far as compression strain is concerned. My experience has been that our draught timbers are first driven in before they are pulled out, and to prevent that we have put in those filling blocks.

In answer to questions by President Rhodes, Mr. Schroyer said that the distance from end sills to face of buffer blocks is 7 in., the movement of the springs is 1¾ to 2 in., and that the deadwoods are 18 in. apart when the faces of the draw-bars are together. The draw-bars project 9 in.

Now, regarding the tail pins and pockets, the committee does not know of anything better to do than to recommend to the makers of the Janney type of draw-bars, the construction of a bar on which this pocket can be used and in which a tail-pin also can be used. The Janney Company is now constructing a draw-bar with rivets through it. I do not consider that the best method of doing that work, simply because there are so many pieces in the construction, and there is no reason why it should not be cast solidly on the bar. It is only a question of four or five pounds, and that is of little consequence. There is now on the market quite a variety of draft rigging, all of which is very good, but we have steered clear of it to some extent on account of the patents, and we thought we could get up a rigging of our own that would be good enough.

The PRESIDENT: What is the thickness of your followers?

Mr. SCHROYER: One and one-half inch.

Mr. GIBBS: Our spring is 7 in. in length, and the springs have 18,000 lbs. capacity, and the motion not less than 1¾ in. I think, before the adoption of any new standard rigging, an important question to consider is the advisability of using a longer space to get the proper amount of motion. It is a matter of more importance for close couplers.

Mr. SCHROYER: Regarding the 2-in. motion of the spring, we place it at 1¾. We first consulted spring makers on that subject, and they have given us a spring which fills the specifications fully. Regarding adopting a draw-bar rigging as a standard, I have not recommended that. Probably if I had the time to go into the subject thoroughly, I might be inclined to do so. We recognize the fact as well as anybody can, that 7 in. is too short for a draw-bar spring. Our old standard spring used in the same pocket was 8 in. in length, with a 1 in. follower plate, but the follower plate was not heavy enough, and we took a 7 in. spring, with an inch and a half follower plate, choosing, of course, the lesser of the two evils.

The PRESIDENT: I hope that when the committee presents their report it will not be simply by presenting designs of a draught rigging. I hope they will tell us that the draught rigging they recommend will stand, and that they will give it to us in figures. I hope that they will be able to give us an idea of the blow it will take to disarrange this rigging. It could be very readily done under a suitable drop test. Various kinds of rigging could be fitted up in different ways, and the one that is the strongest the committee naturally would recommend. I am led to speak about that because the rigging on the C., B. & Q. is everything but satisfactory and we are investigating the matter, hoping to get up something better, but we are also looking for a good deal of information from this committee at the next Car-Builders' Convention. A subject that has been recommended to me already on the C., B. & Q. is, that we keep the cost of repairs at the different shops, and that if we did that, we would take a great interest in improving our rigging.

Mr. SCHROYER: That committee is not to report on a draw-bar rigging, but simply on the carrier irons, the buffers and the length of the draw-bar, but we would like to hear from inventors on the question of a cushioned buffer.

The PRESIDENT: I have here some small drawings which may be of interest. They show the result of some tests of draw-bar fastenings. This broke immediately back of the head at 105,000 lbs. In three cases at 152,000 lbs. the rivets sheared off, but the casting broke at about 105,000 to 110,000 lbs. in two cases. That showed us that the yoke, as secured to the draw-beam casting was the strongest part of the rigging. Then here, again, are six different tests. In one case the truck is turned over on itself and two bolts put together, and they were pulled apart. The first one broke where the iron was turned over and doubled on itself. Probably the iron may have been injured in heating, or something, but it broke at 68,000 lbs. We then had another case where the iron was turned over and held with a bolt. It broke again where it was turned over, at 62,000 lbs. In another case the iron was turned over simply and not held together with a bolt. It broke at 46,000 lbs. In another case the iron was turned and a bolt put through securing the two pieces. That gave one of the best tests, showing 78,000 lbs. In the fifth case two pieces of iron were laid together and secured with two 1-in bolts. They pulled apart at 59,000 lbs. It has been our practice on our freight-car trucks to turn up the ends of the arch bar. We found that in turning up those ends it was frequently difficult to get iron that was absolutely free from hot shortness or iron that was absolutely free from cold shortness. Therefore, we made these tests, and we accomplished our object by bringing up our bolts an inch and an eighth. They don't turn over at all.

Mr. SCHROYER: It would be a matter of considerable interest to know the relative strength that exists between this draught rigging here and the draught rigging with the tail pin. Regarding the securing of that pocket, heretofore we have always used a bolt, but we found that the nut works loose, and we are now using a 1-in. rivet, and riveting the pocket on to the bar, just one rivet. On our truck arch bars we use 1½ in. bolts, and we have no trouble with them shearing off, don't turn their end up at all.

Mr. COOKE: With the Hoovey draught rigging they have an inch bolt on the top and bottom to hold the lugs together. The bolts run lengthwise of the draught timbers. We have used quite a number of them.

Mr. SCHROYER: It is a matter of a good deal of importance that whatever is used by any road is something that can be

used on the old cars. We considered that before we took this draft rigging, and those stop castings can be put on the old cars where the old ones are taken off, and wherever a new draught timber is put on, we use the old stock of draught timbers which we have.

Mr. GIBBS: On our road we formerly had draw-lugs with two bolt-pins, rounding on the back. We have now adopted something which I judge is very much like that of Mr. Schroyer's. We use four bolts, so that the casting is now very strong, and we can put it on the old draught timbers by simply cutting off a very little. We use the yoke.

Mr. SCHROYER: Another difficulty that was encountered in the use of our old draught rigging was that without the use of filling blocks at the rear end of these draught timbers, to prevent any backward motion of the timbers, we have had the timber split out at the bolt-holes, and in the use of this, as far as we have gone, we have never yet found a case where one of these bolt-holes has been split out, and we think we shall obviate that difficulty entirely.

Mr. SMITH: This draught rigging, as Mr. Schroyer shows it there, we have found on his cars; but we found that the draught rigging was too strong to withstand the shock of a blow and would split the sills of a car, whereas the old rigging, if the draw-lug should break, it would save not only the draw-wood, but also the sills.

Mr. SCHROYER: If such a condition of affairs exists, we don't know it, and it can exist only where the filling blocks have not been put in the rear end, which is not done out on the road, only at the Chicago shops.

Mr. SMITH: We have been following the question up very closely within the last two weeks. There has been a complaint that our draw castings were breaking, and 73 per cent. of the deadwoods found in our yards had broken through the holes, but all were back castings that were broken, which showed us conclusively that the casting was strong enough for any pull, but not strong enough for the blows that they received. We have thought that if we made them any stronger, we should be more liable to break our draw-heads.

Mr. SCHROYER: I can readily understand how you can get one part of a car too strong for some other parts. We have used heretofore a 15,000 lb. capacity draw-bar spring, but we found it to be entirely too light, and we have had to replace a very large number of these springs within the past year. We are now increasing the capacity of that draw-bar spring to a maximum. We cannot get a greater capacity in that spring than we are now getting, and we want all that we can have, to be consistent with safety in the life of the spring. A spring that will have at least 18,000 lbs. capacity. As a result of that, we increased the resistance at that point, which helps our draught rigging very considerably.

Mr. GIBBS: In another small particular we have changed lately, and that is in the shape of follow plates. We formerly got them with rectangular section, with sharp edges. The pocket is bent there, and the consequence has been that we have cut the pocket there. We have lately designed one to prevent that difficulty.

Mr. SMITH: That point is one which we have had a great deal of trouble with. Our boxes are rounded on the corner, and when it comes in it presses the spring out ⅛ in.

The PRESIDENT: I think this discussion has brought out one interesting point, and that is that in making a thing strong we may make it too strong. Such a case came up recently on the C., B. & Q. in the matter of crank pins. At first they broke, and we increased the size of the crank pins and got good results from them for some time, until recently there have been several cases of broken crank pins. They were sent to the laboratory where they examined them and found them all to be correct, and according to specifications, and yet they broke. One of our Master Mechanics had these pins break as well, and without going into the matter very carefully, he just said he would make them big enough so they wouldn't break, and he increased the hub to 5½ in. and the diameter of the crank pin to 4¼ in. I saw him the other day, and he said he had had enough of that kind of a thing. He got broken wheels now, and he was going back to 4 in. crank pins.

Jull's Centrifugal Snow Excavator.

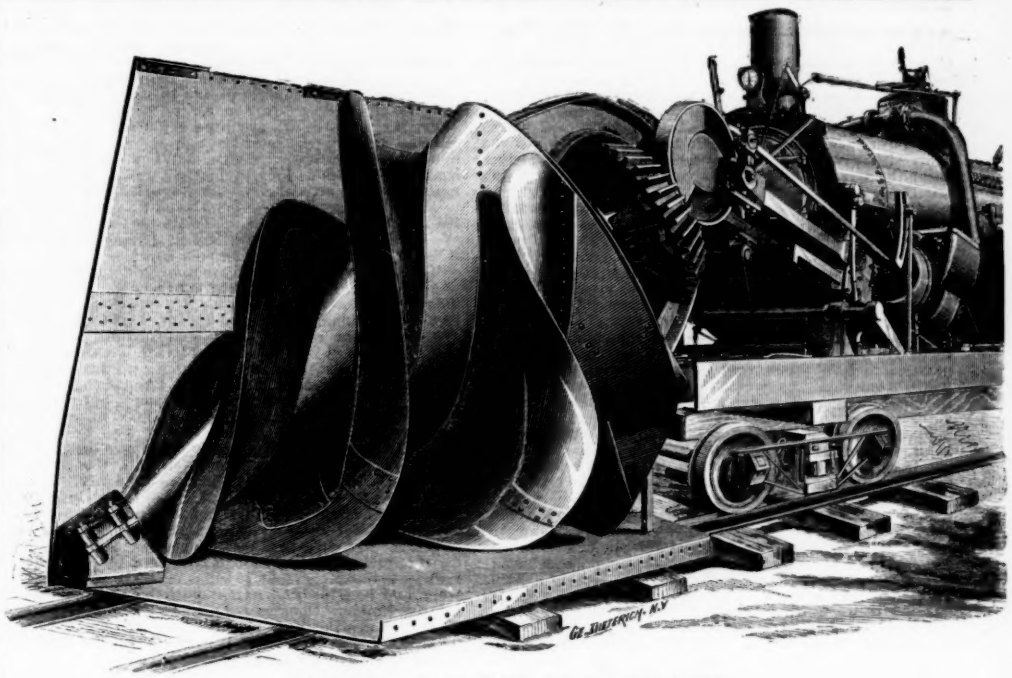
Within the last three years the efficiency and value of a machine snow plow have been very thoroughly demonstrated by the performances of the well-known Leslie Rotary, on many railroads in the United States and Canada. It is believed that there are now something like forty of these machines in service, but the phenomenally open winter just passed has not given occasion for much additional information as to its usefulness. The records of the winter of 1887-8, however, are sufficiently full to leave no doubt of its economy on many roads and its absolute necessity on some.

The machine which is illustrated in this issue is the first one, and, so far, the only one built under the most recent patents of Mr. Jull. This new machine, which is called the Centrifugal Snow Excavator, was built by the Southwark Foundry & Machine Co., of Philadelphia, under patents owned by the Jull Manufacturing Co., and has recently been subjected to trials on the Rome, Watertown & Ogdensburg.

It will be seen that the excavating apparatus is a radical departure from the form made familiar in the rotary. The cutting plates are placed spirally on a cone which stands diagonally across the hood. These blades have a sharper pitch towards the apex than at the base of the cone, and are concave, so as to carry the snow back as it is cut off. The snow is discharged through openings at the top of the hood in the same way as it is from the rotary, and may be thrown out either side of the track, according to the direction of the wind. This machine, complete in working order, has a calculated weight of 65 tons, and is 50 ft. long over all. The weight of the cone is about six tons, and of all the machinery forward of the truck about 20 tons. The boiler has 220 tubes, and its capacity is estimated at 800 H. P. The auger is driven by two engines through the bevel gear shown in the illustration. These engines have 18 by 24 in. cylinders. It is the intention of the makers to run the machine at a speed as high as 320 revolutions per minute, although we understand that in the trials made the speed was limited to less than 200 revolutions.

With the hood in its normal condition the excavation cut is 10 ft. wide, but detachable wings are provided, which can be put on after the first cut is made, which will considerably increase the width of the excavation.

A trial was made near Oswego, N. Y., March 11. There were present Mr. Hobart, President, Mr. C. H. Otis, Treasurer, and Mr. Jull, of the Jull Manufacturing Co.; Acting General Manager Bowen, Superintendent of Motive Power Haselton and Superintendent of Transportation Currier, of the Rome, Watertown & Ogdensburg; Mr. Pascoe, Superintendent of Bridges, and Mr. Caffrey, General Roadmaster of the Lehigh Valley; Mr. Titus, Division Superintendent Southern Central, and Mr. McCarty, from the Pennsylvania Railroad. The excavator was pushed by two locomotives—one 16 by 22 and one 17 by 24 cylinders. The test was made on a siding on which the snow had accumulated to a depth of from 2 to 10 ft., and the rails were heavily coated with ice. The excavator was not equipped with flangers, and it was stopped three times in clearing 720 ft. Deducting the time consumed in these stops, the excavation was made in 7 minutes. The snow was thrown out in a sheet 4 ft. wide to a distance of about 60 ft. It is stated that Mr. Bowen estimmated that to clear the same piece of track would have taken a day's work of 100 men. The Jull Co. intends to take orders at once for the manufacture of this machine.



THE JULL CENTRIFUGAL SNOW EXCAVATOR.

Axles for 60,000-lb. Cars.

At the last meeting of the Western Railway Club the discussion on the proportions of axles for 60,000-lb. cars was continued from the February meeting.

Mr. JOHN HICKEY (Milwaukee, Lake Shore & Western) said: Much stress has been laid on the point of retaining the M. C. B. distance between centres of bearing. In this, are we not, to some extent, losing sight of the main point, namely, that of designing a safe and economical axle for cars of high capacity? Had we not better pause and ask squarely if by adopting the distance 6 ft. 3 in. between centres of bearings we should in any way impair the efficiency of an axle for heavy cars? The size of the journal is the basis of axle; this being established, all the other dimensions will easily follow. To settle on a certain length between centres of bearings without first knowing the size of those bearings, may be time lost. It would be well if we could retain the Master Car-Builders' distance between centres, without impairing the efficiency of other parts, but it is not quite apparent that this can be done. It is true there are some advantages in retaining the old length between centres of bearings, but there are also drawbacks in connection therewith. Different axles and journal bearings of different lengths in the same class of cars is likely to create confusion with car repairers and inspectors, and may interfere with the interchange of cars. We ought not to lessen the distance (2½ in.) between the inner shoulder of journal and hub of wheel, because an oil-box, strong and suitable, at that point is necessary to the successful running of the journal. The dust-guard should be thick, and its retaining walls should be sufficiently strong to resist the end thrusts, and those conditions cannot be obtained with a distance less than that I have mentioned.

It is claimed that when an axle has rendered safe service, in cars of high capacity, it can be transferred to cars of medium and light capacity, until it is entirely worn out. If cars of less capacity than 40,000 lbs. were to be continued in service, which is doubtful, the construction and situation of arch bars will not in many cases permit the introduction of the large axle. If they were fitted so as to receive it, a questionable amount of complications incident to a change of axles and brasses for the different classes of cars will arise. While a certain amount of duty in ordinary service will not affect the strength of the axle, yet it is certain that a large number of revolutions, in connection with the shocks and strains and changes of temperature of a car axle, is followed by a reduction in strength; and, in handing the axle down from one class of cars to another, we may be asking from it too many revolutions under loads and concussion for safety. The greatest pressure brought to bear on railroad companies at this period is the demand for freight cars of higher capacity. The old cars, or cars having a less capacity than 40,000 lbs., are rapidly enlarging the scrap pile. There are several good reasons for this. Railroad companies can haul freight at less cost per ton a mile in cars of high capacity; cars of low capacity are usually of frail construction, and when placed in trains in connection with heavy and high capacity cars they are unable to withstand the shocks of their overgrown neighbors, and the result is, and will continue to be, a total wiping out of the light weight cars. So we need not worry about axles for lighter cars than 40,000 lbs. capacity.

This will practically leave the field in possession of two classes of cars, namely, those having a maximum capacity of 45,000 and 65,000 lbs. respectively. The body framing, the draw gear, the body and truck bolsters, the arch bars of truck, the springs, and, in fact, almost all parts of the car must, of necessity, be different, caused by the great difference in loads. If, as has been admitted, all these things must be of different design, where is the great harm in having a differently designed axle? To say that a six-wheel truck would be the right thing for heavy cars is not meeting the question of a suitable axle for a four-wheel truck, and while I have no doubt that the former project is worthy of serious consideration, yet the country would be flooded with all styles of axles for heavy cars before we could convince the people that such a move would be the most economical. From a conservative standpoint it plainly appears that cars of 60,000 lbs. capacity require axles, wheels and oil-boxes of special design, and if, after a due amount of service, it is desired to change the axles to cars of lighter capacity, let them be so designed that they can be used by cutting off the outer collar and replacing it with a new one at a proper distance from the inside collar, suitable to the truck in which it is to be used.

I have here a sketch showing the dimensions of axle and oil-box for 60,000 and 65,000-lb. cars, the inside collar of journal being the same distance apart as the M. C. B., and if it is desired to change it to the M. C. B. present standard it can be done by simply removing the end collars and welding others in their places at a point which will give a bearing of 7 in. in length. In doing this you can also discover any existing defects. This shows the axle as used on some of our cars for the last 15 months; also the axle in the Master Car-Builders' box and in the box we have designed for the 60,000-lb. car. From my experience in this matter, and in running cars of high capacity for the last 12 or 15 months, I should say that an axle with a bearing less than 4¼ in. in diameter and 8 in. long would be too small. The dust-guard bearing should not be less than 5 in. in diameter and 2½ in. long, and the wheel fit should not be less than 5¼ in. by 7½, and the axle at the centre should not be less than 4⅝. I think those are the dimensions that you will find most satisfactory for cars in heavy service.

The PRESIDENT: Mr. Hickey, I believe the bulk of the cars on your line have 6 ft. 3 in. from centre to center of journals

Mr. HICKEY: No; the distance for heavy cars is 6 ft. 4 in., and that is the axle that I recommend, on account of 2½ in. being the necessary distance from the hub of the wheeel to the inner shoulder of the bearing.

The PRESIDENT: Have you ever put the Master Car-Builders' axle under those cars, or cars of other roads that may have more than 6 ft. 3 from centre to centre of journals?

Mr. HICKEY: I have not.

The PRESIDENT: This is an interesting point, because there are many roads that only have axles 6 ft. 3 from centre to centre of journal, and every once in a while they have to replace cars of a greater distance from centre to centre; for instance, 6 ft. 4. Now, does the road with 6 ft. 4 centres keep axles on hand specially to put under cars of 6 ft. 3, and does the road with 6 ft. 3 centres keep axles on hand specially to put under cars of 6 ft. 4? If they do not do that, are we not constantly using this 2 in. dust-guard quite frequently under our equipment.

Mr. HICKEY: I do not quite understand why it is necessary to lengthen the distance beyond 6 ft. 4 in. I find that to be as long as is necessary. Of course the farther we go from the wheel, the stronger the axle has got to be at the point of the dust-guard bearing and next to the hub.

Mr. GIBBS: Our standard axle before adopting the Master Car-Builders' was 6 ft. 3⅝ in. from centre to centre. Lately in building some 50,000-lb. cars for coal and refrigerator use, we have designed a new axle; 4×7 journal, 6 ft. 3 in. from centre to centre of journal, and 2½ in. dust guard, 5¼ in. wheel fit, and 4⅛ in. centre. That axle, of course, would interchange with the Master Car-Builders' when it is worn down, and is intended to be used in the same box. The wheel fit is 4 × 7.

Mr. SCHROYER: Since the defeat of the axle that was submitted by the Master Car-Builders to letter ballot, I do not think there is any question that the journal that will be adopted will be 8 in. To let you know some of the difficulties that we have encountered on the Northwestern as the result of changing the centres of journals, I want to cite a case that we are just now engaged with. We had a great many axles in the service that were 6 ft. 3 in. centre to centre of journal, and 3¾ × 7 journal. Four inches was the diameter of the centre of the axle. We found that those axles were too light in the centre for our 40,000-lb. cars. They were all taken out of the 40,000-lb. cars, and we had 2,000 of them at the shops at one time, all of which were good for a lighter car, if they had not been too long between the centres of the journals. Our standard journal, previous to the use of the M. C. B. standard, was a 6-in. journal; 6 ft. 2 in. I think from centre to centre, and those axles could not be used under our light cars as a result of that very thing. To utilize these 2,000 axles, I have had them taken to the blacksmith, and a new collar welded on. It is

not alone a question of strength in the axle, when increasing it to 6 ft. 4 in., or 6 ft. 4⅜ in. from centre to centre, or because we cannot get an axle that is strong enough when increased to that distance, but it is a question as to the use of those axles after they have once been worn out in the service of our 60,000-lb. cars. Nor is there any consistency in our using in a 40,000-lb. car a new axle 3¾ × 7 journal after our 60,000-lb. car journals have worn down to that same size. Would you take them out of that service, and scrap them, simply because they are an inch too long for the trucks that we have framed for our 40,000-lb. cars? I do not believe there is a doubt in the mind of any man in this room to-day regarding our ability to construct a box for the increased size of axle, using 6 ft. 3 in. from centre to centre. So far as the dust-guard of that axle is concerned, it is a matter of reducing it from 2½ in. down to 2 in., to accomplish this. The standard axle of the Pennsylvania Company for years and years has been a 2 in. dust-guard and the distance from centre to centre of journals 6 ft. 3¾ in. I would like to hear from some of the Pennsylvania men, if there are any of them in the room, as to whether they have carried in stock the Master Car-Builders' axle to put into our cars. I say right here, with all candor, that I have put many a Master Car-Builders' axle under Pennsylvania cars, and I have not even notified them. There was say a quarter of an inch difference between centres, but that is taken up by the brass at either end, and that axle can be run in their cars just as successfully as the axle they are using to-day. I do not believe that when I have done it I have done anything wrong, and I do not believe that they will say that I have. I cite this case of the Pennsylvania with the 2-in. dust-guard, because they have used it with good results, of course, or they would not have continued its use. We see right here what can be done by using a 6 ft. 3 in. centre to centre, and, as I said at the last meeting, I consider that a question of the greatest importance regarding a standard axle, and so I do to-day. Concerning the diameter of the axle, I consider it very important that the diameter should not be of such size as to compel us to change the bolt holes now in the oil-box.

Mr. GIBBS: If we stick to the 7-in. journal, then I think there will be no question raised as to the distance from centre to centre. Six feet three inches would be adopted without any question. I think though that 4⅛ by 7 would be a better proportion for the journal than 4 by 8.

Mr. SCHROYER: At the last meeting a motion was carried that it was the sense of the meeting that the distance of 6 ft. 3 in. centre to centre of journals was correct for an axle for a 60,000-lb. car. Now, in order to facilitate this thing a little more, I move that it be the sense of this meeting that 4¼ in. is the proper diameter of the journal, and 8 in. the proper length for a journal for a 60,000-lb. car.

The PRESIDENT: It looks to me a little as though the matter was largely dependent on the dust-guard. Since our last meeting I have felt that we had considerable light thrown on the subject of axles. It was a little news to me at first that the Louisville & Nashville road had used this 2 in. dust-guard so successfully. I was on a road some years that used 2-in. dust-guards, and I never heard a complaint regarding them. Mr. Hickey has drawn out some of the points, and if the others who are using it will aid him, we shall see both sides of the question. I am free to say that after using the 2-in. dust-guard for nearly ten years, I never heard any complaint about it. We have, on our road, ordered 20 cars fitted up with an 8-in. journal, 2-in. dust-guard, 6 ft. 3 in. from centre to centre.

The next point that was brought out at the last meeting, and which I think is quite important, is that with the longer journal the centre of the journal is nearer the wheel. We made a change in our passenger equipment not long since. We increased the distance of our journals from centre to centre in order to get a longer journal, and retained our 2½-in. dust-guard. The result was that before long we had broken journals under our passenger equipment. Their diameter was 3½, and they had never broken at that size when the journals were shorter. The order now on the C., B. & Q. is that no journal shall be turned up at the shop that won't make 3⅝ diameter. If we move the centre of the journal further away from the wheel, we will have more broken journals under our freight cars than if we keep our present centres. I feel that perhaps we do not know all that we ought to about those journals, but if we are not quite sure about it, let us test the truth of the theory we are advocating by fitting up cars.

There is another question that I am not going to touch on very much, but which I think is also deserving of experiment, and that is the collarless axle. I think Mr. William Forsyth will show you this afternoon some tests that have been made with it. We are not prepared to advocate a collarless axle at this time, but I do think it behooves the master car-builders and mechanics to look into that matter.

Mr. WILLIAM FORSYTH: We are not so much interested in 60,000 lb. capacity cars, because we have no cars of that capacity, and I have not seen many good arguments for using cars of that capacity; in fact, I think it is pretty hard to find arguments for using such cars. But we are interested in it as a matter of interchange. It is a matter of interest to us that the axle used shall be suitable for the cars which we have, and we are, therefore, very strongly in favor of that dimension which has been recommended by the club. We are not so particular about the size of the journal so long as it is strong enough.

I am still very much in favor of the collarless axle. At our meeting in May, 1888, I presented a drawing showing the collarless axle for a 60,000-lb car, and its arrangement in the present M. C. B journal box. That was illustrated in the *Railway Review* of May 19 and the *Railroad Gazette* of June 8. I have a drawing of it here, and I refer to it now, because since that time we have put some of them in service under a consolidation tank, and it has been running nearly seven months, making a mileage of about 20,000 miles, equal to the average mileage of a freight car for about a year and a half. It has been running on one of our Iowa divisions, in very hard service, no repairs have been made upon it, and we heard nothing of it until it was sent to us in its present condition. They told us that the other bearings were in as good condition as this. It was put into an ordinary freight car truck. This axle is 6 ft. 3 in. from centre to centre, the dust-guard is 2½ in. and the journal, 7⅝. If it is desirable to make that 8 in. it can be done by a sacrifice of ⅜ in. of the dust-guard, which is now 2¼, making it 2½. The other drawings that I have here show the same axle in the present M. C. B. box. I call attention to this to rather encourage the use of the collarless axle, and in the second place to show that we are not very particular about the exact dimensions of this axle beyond the wheel seat, because we could turn off the collar and use it in this form so long as it would provide a journal about 8 in. long. The diameter at the centre is 4¾, the diameter of the wheel seat is 5⅝. I am pretty well satisfied that those dimensions recommended at that time will be found to be about correct, and if we have an axle which in the rough is 4¾ at the centre, which will provide a wheel seat of 5⅝, and which is any distance from 6 ft. 11¼ to 7 ft. long, it would be quite satisfactory to our road, and I think we should favor it. As I said, not because we expect to use it for 60,000-lb. cars, but no account of interchange. The point is to get an axle which, in the rough, has about the right dimensions, and which can be made to suit journals as required. The other important thing is for the club not to saddle itself with a lot of dimensions which the other roads will not favor, but try to carry through, if possible, the dimensions 6 ft. 3 in. centre to centre.

Mr. MACKENZIE: We are using a journal very much the same as Mr. Forsyth describes, and we are using what is known as the Johann wedge. When the thrust comes against it there is nothing to make it raise. The axles are giving excelent satisfaction. They are the same size at the collar as the Master Car-Builders', and they are 6 ft. 3 centres. We put them right into the Master Car-Builders' box. We have no trouble with the the box striking the hub of the wheel, and consequently no broken boxes.

Mr. SCHROYER: I made my motion just to get the question before the house. I think the balance of the points involved will be easily solved after that question is settled. We have no cars in our service to-day of 60,000 lbs. capacity. We have some of 50,000 lbs., and I think hereafter the cars constructed will be all of 50,000 lbs. capacity. But with 50,000 lbs. cars we feel that we are not safe to run with the present M. C. B. axle. I belive that the results of a 4¼ in. journal would be satisfactory, but the journal that we are going to use under our 50,000 lb. cars will be only 4 in.

Mr. HICKEY: I think that many of the members will agree with me in saying that an oil-box close to the hub of the wheel will run much better than one far away. Mr. Mackenzie made a point in saying that no one he knew of had ever found any fault with the box breaking. The reason was that they had it so far away that there was no chance for it to break. My purpose in designing a box for a 60,000-lb. car is to make it strong enough at the box to give that wall sufficient strength so that it will come up to the hub of the wheel and help the brass in taking up the thrust. The Master Car-Builders' thickness of dust guard itself, that is the space in which the dust-guard is placed is ¾ in. I proposed making it a 16th larger and I would have the inside wall ⅝ in. thick. We must have that inside wall to be safe inside the shoulder a little distance, not less than ¼ in. anyway. Add up all those, and you have 2⅛ in. nearly, and I believe that distance is necessary. I am in favor of keeping that length of dust-guard. The axles that we have have the inner shoulders farther apart that the Master Car-Builders'. When I put them in, I reckoned that when those axles got too small for service in cars of 60,000 lbs. capacity, we would take them into the shop, and prepare them for further service. It is true that axles under ordinary usage will not deteriorate in strength, but we all know that as the axle grows less in diameter, and it is subjected to the strains and shocks of a railway axle, and also subject to heating, that it must reduce in strength.

Mr. MACKENZIE: I think that the members of the club should not lose sight of the fact that all the car-builders of the country who have built these heavy axles, have constructed an entirely different truck than has been used heretofore. What can we do with the 6 ft. 3 in. axle if we adopt it? It seems to me that when we get to 50,000 lbs. that ought to be the limit, unless it is some special car. I think it would be well for the members to look at that very carefully when they are going to adopt the length of the axle. As far as I am concerned I would like to increase the diameter of the axle, but not the capacity of the car. I think 40,000 lbs. is enough. We have had good results from the use of a large axle.

The PRESIDENT: I notice in our discussions there is one point that comes up now and then: The members seem to have some diffidence about recommending a standard for a dimension for a car that they are not building on their own road, and in some cases the parties who are constructing cars of large capacity are apt to feel a little aggrieved, perhaps, that those who are not constructing them should criticise them. I don't think that such diffidence should exist. Let us take the case of the Baltimore & Ohio 40,000-lb. car. It comes on to the Northwestern road and the axle breaks. Who foots the bill? The Northwestern, though they may not be building any cars of that capacity. They are interested in the dimensions of axles of cars that go on their road, so that I think it is quite necessary for all roads under the interchange rules to be interested in the cars and equipment that comes to their lines. Practically, for the time being, these cars belong to the road on which they are. As far as we are concerned, although we are not building 60,000-lb. cars, we have lots of 60,000-lb. cars on our road, and we are responsible for their maintenance just the same as though they were our own cars.

Mr. Schroyer's motion was then voted upon and carried.

Mr. William Forsyth moved that the club recommend a diameter of 4¾ in. for centre of axle. Carried.

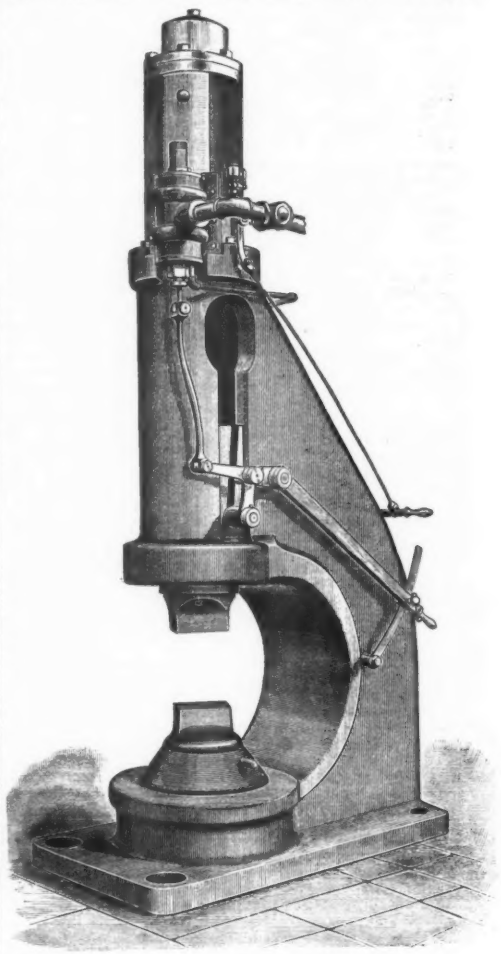
On motion of Secretary Crosman the subject was carried over to the next meeting.

Guild's Automatic Steam Hammer.

The accompanying cut shows an automatic steam hammer made by the Knoxville Car Wheel Co., Knoxville, Tenn. This hammer embodies several improvements in design which call attention to the details of the construction. The cylinder is larger than in most hammers of this class, the object being to acquire a short, quick and powerful stroke, in preference to a long slow one, and the manufacturers claim that this type of hammer is more powerful than any other in the market, having the same rated capacity. The dies have a round pin fitting into a round pocket in the die box. The die is held in the die box by a large round dowel or key, which passes through the die block as shown in the cut. This dowel fits a semi-circular groove, which passes around the stem of the die. To change the angle of the sides of the die with the body of the hammer it is simply necessary to loosen the keys, thus allowing the die to be turned to any desired position, after which the die is secured by driving the key to a seat in the groove. The location of the die and die block is such as to facilitate the formation of square corners in forging. The valve gear has been located on the outside of the hammer in order to render it more accessible for repairs. Steam is admitted both above and below the piston, and the action of the hammer is either automatic or non-automatic as may be desired for the different classes of work. The wide range in the force of the blow is a notable feature in the operation of this hammer. At the top of the cylinder on the inside is placed a heavy volute spring, which will remove the disastrous effect of heavy blows resulting from careless handling.

The guide for the ram is cylindrical, and is bored at the same time as the cylinder of the hammer, thus insuring perfectly alignment. The piston-rod and head are forged of steel in one piece. The ram is made of hammered wrought iron.

The housing where the anvil passes through is bored true to receive the top of the anvil, which is turned off to fit. By having the ram and anvil in line, all that is required in making the dies for special work, is to make them true to the shank, and they will come exactly in line when in position. The valve is a simple piston, with two steam packing rings. The steam chest is lined with a brass bushing. This bushing has a series of holes drilled in it to correspond with the annular recess in steam chest. The advantage of this is that it gives a freer passage for the steam. The valve being hollow is perfectly balanced and very easily handled. The valve



Guild's Automatic Steam Hammer.

connections being all on the outside, it is very convenient to get at.

This hammer is made in three sizes, viz.: 650 lb., 1,000 lb., and 1,250 lb., the general dimensions of which are as follows:

650 lb. size:—Cylinder, 7½ in.; diameter piston rod, 3 in.; stroke, 20 in.; face of die, 5 × 9 in.; weight of anvil block, 4,000 lbs.; total weight, including anvil block, about 9,350 lbs. Largest size of shaft which can be beaten out at a single heat, 5 in.

1,000 lb. size:—Cylinder, 9½ in.; stroke, 20 in.; ram, 12 in. diameter by 20 in. stroke; dies, up to 12 in. by 12 ; weight of anvil block, 8,500 lbs.; total weight of hammer, including anvil block, about 18,000 lbs.; largest size of shaft that can be beaten out at a single heat, 7 in.

The dimensions of the 1,250 lb. size are similar to those of the 1,000 lb. size, with the exception that the ram is 13¾ in. in diameter by 25 in. long; largest size of shaft that can be beaten out at a single heat, 8 in.

These hammers are particularly adapted for railroad work. They have special dies for making coupling pins, which can be fitted to any class of hammers. The simplicity of the details and accessibility of the parts, as well as the neatness of design of this hammer, are so clearly shown by the illustration as to need no further description.

Uniform Standard Time.

The Special Committee on Uniform Standard Time presented at the last annual meeting of the American Society of Civil Engineers the following report, which was accepted:

The last annual report of the Committee referred to action which had been taken by the General Time Convention the year previous, with the view of securing an expression of opinion from members of that association on the subject of the 24 hour notation. Circulars had been sent out by the Secretary of the General Time Convention, directing attention to the contents of a pamphlet issued by the American Society of Civil Engineers, setting forth the experience which up to that date had been gained on the Central and Mountain Divisions of the Canadian Pacific Railway, where the new notation had been in use for some months. A series of questions also accompanied the circular, to which members of the General Time Convention were requested to furnish replies.

The replies were referred to in the last annual report of this Committee, where, among other things, it was stated that 61 affirmative and 38 negative replies had been received in reference to the question, "Are you in favor of the general adoption of the 24 o'clock system of counting the hours—abandoning the use of a. m. and p. m.?"

It was deemed important to ascertain the precise character

of the 38 negative replies, and accordingly application was made to the Secretary of the General Time Convention, Mr. W. F. Allen, for copies of the objections which had been offered. Through the courtesy of that gentleman, the information has been received since the last annual meeting of this society.

An examination of all the replies containing objections shows the following expressions of opinion, viz :

6 That the a. m. and p. m. system is good enough.
5 That there is nothing to be gained by a change.
4 That the people should be educated to the new system before the railways adopt it.
3 That the adoption of the change would cause great confusion.
2 That it will be impossible to get men to understand the new notation.
2 That it is advisable to delay adopting the new notation until more experience is gained on the railways now using it.
2 That doubts are entertained if it can be brought about.
2 That its adoption should be delayed until all the railways are prepared to adopt the change simultaneously.
1 A preference is expresed for the decimal division of the day.
1 That midnight should be designated ZERO or 0, in place of twenty-four hours.
1 Has difficulty in offering any serious objections to the new system.
1 Does not think it concerns the public very much.
1 That it is for the Government to authorize the adoption of the new notation rather than the railways.
1 Is of opinion than the change would involve great expense.
1 That there will be some objection to the change whenever it may be made.
1. Is not sufficiently familiar with the working of the new system.

The deductions from this analysis are that, of the 99 railway managers who, in April, 1887, furnished replies to the questions placed before them, there were only six who considered the a. m. and p. m. system good enough, and only five who were then unable to recognize the advantages of the new notation. That the objections were not considered very serious by the writers of them is evident from the fact that in 21 of the 38 negative replies it is stated that they will be prepared to adopt the 24-hour notation if the connecting lines do the same.

The objections which have been raised are met in the most convincing manner by letters from railway men who have now had from two to three years' daily experience in the use of the new notation in operating railways. These communications are placed at the service of the Committee, and compose the following, viz.:

15 letters from managers, assistant managers, superintendents and assistant superintendents.
7 letters from train dispatchers.
8 letters from conductors.
25 letters from station masters.
18 letters from track masters and track foremen.
2 letters from yard masters.

There is a singular unanimity of opinion expressed in all these letters in favor of the new system. At present your Committee cannot do better than submit the two communications which have been last received, viz.:

First—A letter from Mr. Collingwood Schreiber, General Manager of the Intercolonial Railway of Canada, dated the 9th inst.

Second—A letter from Mr. W. C. Van Horne, President of the Canadian Pacific Railway, dated the 10th inst.

Mr. Schreiber says: "I have your letter of yesterday's date, making inquiry as to whether or not the 24-hour system of time notation is still in use upon the Government railways, and if so, desiring to be informed if it gives satisfaction.

"In reply I may say, the 24-time notation was introduced upon the Intercolonial Railway (906 miles) and the Eastern Extension Railway (80 miles) on June 13, 1887; that it has been in most successful operation from that date to this. I anticipated at the time some trouble in having such a novelty introduced, imagining the public press and the employés of the road would combat it, but such has not been the case; not a word of complaint, so far as I am aware, has appeared in the newspapers upon the subject, and our officers and employés, as a rule, appear to view it as an advancement in the right direction, those employés immediately connected with the movement of the trains especially favoring the system. Under this time notation system no confusion can arise, and for this reason greater safety is assured.

"For my own part I may say I am strongly in favor of the 24 hour system of time notation, and I propose, so soon as the Oxford and New Glasgow Railway (70 miles), and the Cape Breton Railway (100 miles), now under construction, are completed and turned over to the operating department, to extend the system to those lines. I think it would be an advantage if it was more generally used by the railways, and I hope, at no distant day, to see its use very much extended; in fact, it appears to me it would be a great advantage if the railway managers throughout the Continent would put the 24-four system of time notation in operation upon their roads; it certainly could not but be fraught with good results. I may, however remark that I do not think the public will readily take it up for general use until such time as it is taught in the public schools; if this was done, I believe it would very soon come into use for all purposes."

Mr. Van Horne says: "Replying to your note of the 6th instant, I am happy to be able to say that our nearly three years' trial of the 24 hour system on all of our lines west of the great lakes, embracing 2,354 miles, has been highly satisfactory. No confusion whatever resulted from its adoption or has grown out of its use, and I have yet to hear of the first objection to it on the part of the public.

"The Manitoba & Northwestern Railway Co., 207 miles, and the Northwestern C. & N. Co.'s Railway, 110 miles, also follow this system. It is therefore the only system used for railway purposes north of the forty-ninth parallel and west of the eighty-ninth meridian.

"We hope soon to be able to extend this system over all the company's lines in the east. We should have done so before this time, if some of our neighboring lines had been in a position to join us in the movement.

"A short experience with it must, I believe, convince anybody that it is vastly superior for railway purposes to the old system. It takes a surprisingly short time to come to think of twenty o'clock instead of eight o'clock p. m.

"There is no danger in its adoption, even on a very busy line. The term 19.47, for instance, in a train order, cannot be mistaken for anything else."

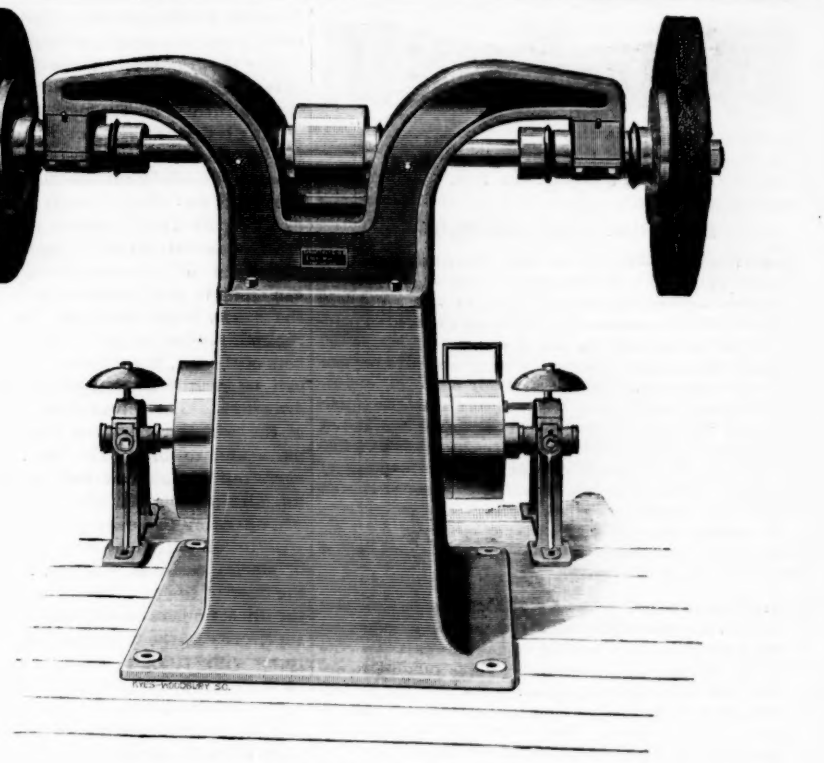
These letters conclusive'y establish that the new notation has been thoroughly tested for two or three years on 3,657 miles of railway, that no difficulty whatever has been experienced in introducing the change, that it has been readily accepted by the public without a single objection being heard, that its extreme simplicity and the impossibility of errors resulting from its use facilitates the movements of trains and promotes the public safety. The new system having thus proved so satisfactory in every way, it has now been determined to employ it on 3,053 additional contiguous miles, which will make a total length of 6,710 miles of railway shortly to be operated under the new notation.

It is obvious that there can no longer be any doubt as to the practical advantages of the new system, and the ease with which it can be applied to the operating of any line of railway. The thirty-eight negative replies which have been cited cannot be said to present insuperable difficulties, and it is believed that the writers of them will now have their views greatly modified by the experience which has since been gained and the explanations made in the more recent letters which have been submitted.

Your Committee cannot but think that in the public interest it is advisable that renewed efforts be made to secure the general adoption of the new notation.

SANDFORD FLEMING,
Chairman Special Committee.

Since this report was made Mr. Fleming has informed us that the 24 hour notation has been adopted by the China Railway Co., and that it has been for a year in use throughout the Japanese Empire.



HEAVY SURFACE GRINDER.

Made by the SPRINGFIELD GLUE & EMERY WHEEL CO., *Springfield, Mass.*

Heavy Surface Grinder.

The machine shown here is built by the Springfield Glue & Emery Wheel Co., especially for grinding and polishing castings that are so heavy as to be handled on a truck. It is designed for stability and steady running, and the long arbor gives good clearance. It has four bearings. The outside bearings are self-oiling. The principal dimensions are as follows:

Weight without wheels	1,600	lbs.
Height, floor to spindle	42	in.
Height of base	30	in.
Length of outside bearings	8	in.
Length of inside bearings	6	in.
Diameter of spindle in bearings	2¼	in.
Diameter of spindle in wheel fit	2	in.
Distance between wheels	60	in.
Length of spindle outside of frame	21	in.
Spindle pully	8 × 6	in.
Emery wheels up to	30	in.

The Master Car-Builders' Committee on Car Heating.

Messrs. F. L. Sheppard, R. D. Wade and Robert Miller, the Master Car-Builders' Committee appointed to continue their report on the subject of car heating, and in regard to the adoption of a standard coupler, request the following information. Replies to the questions should be sent to F. L. Sheppard, Altoona, Pa., as soon as practicable.

1. Name of system in use or trial?
2. Number of locomotives equipped?
3. Number of cars equipped?
4. Number of cars in train to which heat can be transmitted?
5. What is the heating medium?
6. What pressure is carried in main pipes?
7. What pressure is carried in heating pipes?
8. How is the temperature regulated, and does it require constant attention?
9. What provision is made for retaining a comfortable temperature when train is not connected to locomotive?
10. If traps are used, what kind and where located?
11. What kind of flexible connection is used between cars?
12. What couplers are used?
13. What have been the general results with couplers and connections?
14. What have been the general results with this system of heating?

Maine Railroad Commission.

The Legislature of Maine has passed a law increasing the salaries of the Railroad Commissioners and enlarging their powers. This board has hitherto been hampered by lack of appropriations. It appears that its lack of efficiency has been from this cause, and in the last annual report the Commissioners set forth the disadvantages under which they labored. Some of the provisions of the new law are as follows:

Sec. 113. The Governor, with the advice and consent of the council, shall appoint three railroad commissioners who shall act as a board and hold their offices for three years; one of them shall be learned in the law and appointed and commissioned as chairman: one of them shall be a civil engineer, who shall have had experience in the construction of railroads; and the third shall have had experience in the management and operation of railroads. Said board shall be provided with an office and suitable rooms for hearing, in which its record shall be kept; the board may expend $2,000 annually for incidentals and for procuring the assistance of a mechanical expert in the examination of iron bridges. Said board shall also have a clerk, to be appointed by the Governor, on the recommendation of the board. The compensation shall be $2,000 per annum for each commissioner, and $1,200 per annum for the clerk.

Sec. 2. Every railroad corporation shall, when requested by the railroad commissioners, have an examination made of any iron bridge or other structure, by a competent and experienced mechanical engineer. * * *

Sec. 3. Any railroad shall furnish all reasonable facilities to the commissioners.

Sec. 4 provides for taxing the railroads to pay for the board.

Machined Car Wheels.

Notwithstanding the improvements made in the manufacture of chilled wheels, there remains an apparent necessity for finishing them by some method of grinding. Even those made in the contracting chill are turned out with the tread covered with small ridges, which, while not seriously objectionable, must increase the resistance of the train and the abrasion of the rail. These objections have not been considered serious enough to warrant the expense of grinding the wheels by ordinary methods, but makers have considered, and are considering now the possibility of introducing machinery that shall turn out wheels free from this defect. For wheels made in the non-contracting chill the importance of grinding is much greater. They cannot approach so near to absolute roundness and perfect balance as do the wheels made by the more improved method.

Some years ago machinery was introduced for truing the chilled wheel, but the work could not be done as economically or rapidly as was necessary to admit of such wheels coming into general use; besides, the wheels so trued were finished after having been pressed on the axles, and as few consumers buy in this manner, the use of such wheels did not become general.

The New York Car Wheel Works of Buffalo, N. Y., have been engaged for the past two years in building machinery and fitting up a plant for doing the work necessary to turn out wheels perfect in the above respect. The wheels are first bored then turned true on the tread and balanced. The machinery for doing this work is of entirely new design and capable of rapid and economical working. One machine will turn out 40 finished wheels per day. This brings the use of wheels mechanically perfect, within the possibilities for every kind of service. Of the great desirability of having wheels perfectly round and balanced there is no question. Cars will ride smoother and haul easier; the wear on track and bridges will be less and the life of the wheels increased.

The company is now manfacturing cast wheels in diameters 36 in., 40 in. and 42 in., the 36 in. weighing 750 pounds, the 40 in. 850 pounds, and the 42 in., 900 pounds. The use of cast-iron wheels of large diameters has not been looked upon favorably heretofore, doubtless because they could not be made mechanically perfect. If these large diameters can be turned out as accurate in form as steel tires and as cheap as good ordinary chilled steel wheels their use will probably extend.

The wheels made by the New York Car Wheel Works are designated as "machined" car wheels, and a guarantee is given that all wheels sold will be true to $\frac{1}{64}$ in. and balanced to an average of 2½ lbs.; no wheel to exceed 5 lbs. out of balance.

The same company furnishes brake shoes, truing them on the face, so that perfect contact is secured when the brakes are applied, and the wear of the shoes having been commenced in a proper manner, continues in the same way until they are worn out.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The most recent decisions of the Inter-state Commerce Commission contain nothing specially new. In the case of the Imperial Coal Co. against the Pittsburgh & Lake Erie Railroad the principle of group rates is explicitly recognized as legal. This is in accordance with the general practice of continental Europe as well as of America, and is chiefly noteworthy because the English courts have taken a different view of the matter. In the case of the Northwestern Iowa Grain and Stock Shippers' Association against the Chicago & Northwestern, the decision is to a large extent a repetition of the principles laid down a year ago in Boards of Trade Union, of Farmington, vs. Chicago, Milwaukee & St. Paul. The chief additional point is that a company by long maintaining a rate without the presence of competition on other than equal terms gives evidence that such rate is not too low. This view is so much in harmony with the interpretations already given by the Commission that it will surprise no one, even though it be somewhat more explicit than anything which has been hitherto said with regard to this particular point.

State legislation on the matter of car heating goes on. It is a popular line for the legislator to pursue, and he sees no harm in it even if it does no good. Among the laws passed by the Maine Legislature, just adjourned, was one prohibiting the use of stoves for heating passenger cars, under penalty of $500 for each offense; and the use of naphtha or any fluid that ignites at a lower temperature than 300° F. was forbidden under like penalty. Meanwhile, the officers of the railroads, impelled probably more by the conviction that continuous heating is sure to be fashionable, and very likely to be economical, than by legislation, are experimenting, investigating and watching. We published last week a list of 60 questions sent out by the Superintendents' Association, and in this issue will be found the circular of the Master Car Builders' Committee designed to collect information from actual experience. The answers to both of these circulars when collected and compared will have a very great negative value, as they will dispose finally of the claims to consideration of a good many devices and details. Their positive value will be considerable too, but not so great, for some of the most promising systems have had the shortest and most limited trials. Even laws cannot create a new art, perfect from the beginning; and the steam heating men find that they are subject to the same limitations as other inventors,

We call attention to two interesting features in this issue. One is the report of the discussion of the Western Railway Club upon the subject of draw-bar rigging, and the other an illustration and description of the new draw-bar rigging adopted by the Pennsylvania, for heavy freight cars. If any further proof of the necessity for a better draw-bar attachment than that which we are now using is needed, after reading the evidence brought out by the discussion, a comparison of the ordinary draw-gear and the one illustrated in this issue will readily furnish it. The most urgent need now in draft rigging is that it shall not soon become loose and allow lost motion to seriously interfere with the maintenance of a minimum amount of slack with automatic couplers, and that it shall at the same time be easily repaired and adjusted. The device illustrated is a representative one of the class which may be expected to fill present needs. Its great strength can easily be comprehended from the description, and the facility with which it can be repaired, as well as the small injury which will be done to the vital members of the car, in case of its being driven in or broken, can be readily understood by an inspection of the drawings. The precautions taken to protect all of the wood work from the wear of the moving parts and to brace the draft timbers and draw-bar strap laterally, as well as to transmit the buffing and pulling strains directly to the sills of the car, are admirable examples of good designing. We wish to call particular attention to the excellent plan of placing cast-iron washers, of the form shown, in the floor of the car, thus rendering the bolts through the draw timbers readily accessible at all times. The superiority of the draw-bar stirrup, over the ordinary form with straight sides, is too easily appreciated to need further comment. The use of one large cast-iron key in the place of several small ones, and the method of securing the draw-bar brackets to each other by means of notches in the longitudinal straps are steps in the right direction. While this draw-bar rigging may not be in the best possible form, yet it is the strongest as well as the most accessible in case of repairs of any to which our attention has been called, and it promises to meet the urgent demand for a draw gear having a sufficient resistance to withstand the shocks of present freight-car service.

There have been rumors for some months that the Wisconsin Central was to pass under the control of the Northern Pacific. Now these rumors culminate in the actual negotiations for a lease. Whether or not the lease will be made, or is even likely to be made, cannot be told at this time. The matter is still under consideration. It is believed that there is a strong element in the Northern Pacific board which is decidedly opposed to it. The terms of the lease will probably involve the payment of a certain percentage of the gross earnings, and no other undertaking on the part of the Northern Pacific; and it is currently said that the rental is to be 35 per cent of the gross earnings. As the operating expenses for the year 1887, aside from "terminal charges" and rental of engines and cars, were more than 77 per cent of the earnings, the conditions must have greatly improved to justify an agreement to pay 35 per cent. The advantages to the Wisconsin Central of the proposed lease are obvious enough, but what the Northern Pacific is to gain is not so apparent. The former road has large and valuable terminal facilities in Chicago, and the latter will by this connection be put on an equal footing with its present and prospective rivals for the transcontinental traffic to and from that city, but now it has the choice of several Chicago connections with no responsibility as to their earnings. Moreover this does not seem to be a good time to voluntarily take part in the rivalries and contentions of the Chicago-St. Paul lines, the end of which is by no means in sight.

The extension of the Canadian Pacific from London, Ont., westward to Detroit, by which the company will place itself in a favorable situation to secure a share of the traffic from Chicago to the seaboard, is now well under way, and will doubtless be completed within a few months. This fact gives importance to the report published this week that the company is back of the men who have secured articles of incorporation for a railroad from the west side of the Niagara River, opposite Lewiston, into Buffalo. The line, as laid out, will be a somewhat costly one in land damages, and the bridging of the river would be a still more bold undertaking. In view of the statement in the last annual report of the Canadian Pacific, that the Detroit line was not built until after the failure of persistent efforts to make a traffic agreement with the Michigan Central, it seems reasonable to believe that this Buffalo charter is obtained and made public in a similar spirit. A line with a western terminus at Detroit of course desires an eastern terminus at Buffalo, as it is thereby immensely advantaged as compared with one whose outlet is only on the north side of Lake Ontario. The owners of the present bridges across the Niagara and of the lines leading to Buffalo, may probably therefore assume that the Canadian Pacific intends to build a line to Buffalo only in case other satisfactory arrangements cannot be made. It says, in effect, "peaceably if we can, forcibly if we must." If the Rome, Watertown & Ogdensburg is jointly interested with the Canadian Pacific in building a line from Suspension Bridge southward to Buffalo, that fact of course makes it more likely that the road will be built.

The Cleveland, Columbus, Cincinnati & Indianapolis report furnishes an interesting commentary on the effects of the Inter-state Commerce Law upon freight traffic. Most of the disturbing elements which prevent accurate inferences from the reports of other roads are absent in this case. It is less affected by differences in the crops, because so large a part of its tonnage (nearly 80 per cent.) consists of merchandise and manufactures. It is so situated as to carry both wheat and corn, so that the loss from the light crop of the one is somewhat offset by the heavy movement of the other. Its territory has not, of late, been affected by parallel railroad building. The increase of railroad mileage in Ohio and Indiana together, in the five years 1883–1887, was hardly over 600 miles, or less than one per cent. annually—not so rapid as the increase of population. The reckless duplication of connecting lines further west should have tended to increase traffic in this region rather than to make it less profitable. Nevertheless the ton-mile rates show a severe falling off, being only 0.693 cents in 1888 against 0.744 cents in 1887. The report attributes these low average rates pretty directly to the pooling clause of the Inter-state Commerce Act, which took away from the railroads the means of preventing a war of rates which they were most anxious to avoid. Another source of bad economy is the shortness of the average haul under the new system. This was much less in 1888 than ever before. The figures for five years are as follows:

	Miles.		Miles.
1884	169.4	1887	161.2
1885	170.5	1888	156.8
1886	160.2		

The result of this is, that, though the ton-mile receipts have not fallen so low as in 1884 and 1885—years of the severest business depression—yet the average receipts per ton of freight hauled are less than in 1884 and not very much greater than in 1885; while as compared with any year of reasonable commercial prosperity, the fall is most marked. We have laid some stress on these facts, because it is the custom in many quarters to speak as if railroad duplication were the chief cause of the present depression in railroad values. In the case before us there has been no railroad duplication, no reckless precipitancy in wars of rates, and no specially adverse State legislation. Whatever complications there may have been elsewhere, there can be little doubt that the responsibility for the loss in this case belongs to the Inter-state Commerce Act.

Mr. Adams on the Relations of Railroads to Their Employes.

The "Railroad Series" of articles in *Scribner's Magazine*, which was intermitted for one month, and resumed in March in an admirable paper on the Railway Mail Service, by ex-Postmaster-General Thomas L. James, is continued in the April number by a short paper from Charles Francis Adams on the Prevention of Strikes. To those familiar with Mr. Adams' writings it is needless to say that his essay is a clear and forcible one. In a prefatory note he explains that the article was written in 1886, but suppressed because it was doubted whether it would be politic to publish it then. Mr. Adams assumes, however, that the Burlington strike, which has occurred since then, has not removed the necessity for the measures he recommends, nor effected any marked change in the morale of the great body of railroad employés of the country.

Mr. Adams' argument may be quickly summarized. Referring to the difficulties between railroad companies and their men, and to the usual methods of negotiation in such cases, he says:

> No impartial tribunal for hearing charges of misdemeanor against an employé has yet been provided; neither, as a rule, has the suggestion of such a tribunal been looked upon with favor either by the official or the employé. The latter is apt to argue that he already has such a tribunal in the executive committee of his own labor organization; and a tribunal, too, upon which he can depend to decide always in his favor. The official, on the other hand, contends that if he is to be responsible for results he must have the power of arbitrarily dismissing the employé. Without it he will not be able to maintain discipline. The two arguments, besides answering each other, divide the railroad service into hostile camps.

The executive committees of the labor organizations practically cannot save the members of those organizations from being got rid of, though they do in many cases protect them against summary discharges; and on the other hand, the official, in the face of the executive committee, enjoys only in theory the power of summary discharge. The situation is, accordingly, false and bad. It provokes hostility. The one party boasts of a protection which he does not enjoy; the other insists upon a power which he dares not exercise.

A strike almost always presupposes a lack of faith in their employer on the part of employés. Generally they have been told that the wages are as high as the income of the business will warrant, and a strike implies that they do not believe this statement. Looking at the question in this way, the available means for the prevention of strikes must be looked for in the line of renewing or strengthening the confidence of men in their employers. Mr. Adams does not propose any new or startling scheme for doing this. He simply urges the general and systematic adoption of methods already well known. The organization of the service must be more complete and permanent, and fluctuations in the amount of work must be provided for by a temporary body of men. For instance, the Union Pacific employed 12,000 men in the dullest season. These should constitute the regular organized force. The 2,000 additional necessary at certain seasons may be called the transient class, who will strive to get into the permanent class. To induce them to thus strive Mr. Adams would increase wages —say one per cent. a year—at intervals of five years, for faithful service. Promotion should be strictly by merit, and merit only. To provide against the fear of unjust dismissal from the organized service an impartial tribunal for the decision of disputes should be provided. There should be hospital, pension and insurance funds, to which the company and the *permanent* employés should contribute. Railroad educational institutions would naturally follow. "Properly handled, a vast economy would be effected through them." The morale of the service would be raised; and the morale is important, even invaluable. These institutions, in so far as their support was borne by the company, would become regular items of expense in the appropriations made by the directors. But the keystone by which all other agencies are to be held to the harmonious performance of their functions is an impartial tribunal, as just mentioned. If the employé owns a share of a fund he should help manage it. If his position depends upon good behavior he has a right to be heard in the organization of the board which is to decide what good behavior is. No system will succeed which does not recognize these rights. The tribunal, therefore, should consist of a small committee of employés to meet the committee of the employer—to wit, the directors. The Union Pacific, for example, would have fifteen men, one from each of five divisions for the mechanical, operating and permanent way departments, respectively. These fifteen would delegate a committee to meet the directors, and in case of a deadlock an arbitrator previously chosen would untie the knot. This is the gist of Mr. Adams' argument.

Strikes are about as old as history, and for all practical purposes we may agree that the Burlington strike has settled nothing. It has been commonly said that the effect of the contest of the Brotherhood of Locomotive Engineers with the Boston & Maine in 1877 influenced the position and acts of the order for the following eleven years. In like manner it may be predicted that the contest of 1888 will be well remembered all over the country for a decade at least. But in planning remedies for a difficulty of this kind periods much longer than ten years should be considered; and it is to be remembered that the locomotive engineers constitute but one class of railroad employés. It may be readily admitted then, that if railroad companies can reasonably do anything, beyond what they are already doing, towards strengthening their employés' loyalty they should do it. The morale of the employés is indeed an element the value of which cannot well be over rated. Any one who has observed different railroads closely can call to mind instances in which a gradual destruction of the *esprit de corps* in the officers and men of the operating department has been followed by increased frequency of accidents and by obvious decline in the efficiency of the service. The condition of the permanent way and of the machinery has improved by steadily increasing expenditures, but the train accidents have nevertheless grown more numerous. Mr. Adams' three main recommendations, (1) the establishment of an employés' fund, (2) of railroad educational institutions and (3) of a tribunal, may, therefore, be discussed with regard to their relative value and their practicability.

An employés' fund, like those of the Baltimore & Ohio, Pennsylvania and Reading roads, is now well known, and the subject was discussed in these columns last week. If men are to be induced to give up the outside organizations which they have established for insurance and similar purposes, it is important that the employer give them a tangible pecuniary benefit in return. Relief associations afford a good channel for this, because they are similar in nature to the independent organizations, and, therefore, will be understood; and they are practicable because they are in a sense popular. That is, an objecting director could be got to vote for the expenditure of $50,000 in this way who would not vote a similar sum for a bald increase of wages. Railroad educational institutions are needed, and any company that will establish anything of the kind will benefit both itself and the community at large. Objectors to anything savoring of paternal government of employés can, of course, make a point here, but in the present great need for suitable education of young men in the complex art of railroading, most men will be willing to set aside these theories for the time being. On the other hand, the education of young men for the community at large is a work which the average director, aiming at dividends, has little relish for. The Pennsylvania's invaluable work of this kind in its technical departments has perhaps been fully as valuable to other roads all over the country as to itself, for many of the graduates have immediately gone to distant fields. A company cannot grow this fruit for itself unless it plants trees enough to also supply all the apple-stealing boys in the neighborhood. Again, these institutions, like relief associations, are of doubtful value without an assurance of permanence, and a chief obstacle to their establishment is the difficulty of securing this. The Baltimore & Ohio technical school for apprentices was suddenly starved to death when the company became financially embarrassed. But the *spirit* of Mr. Adams' proposition may be brought into play and made to foster good feeling between the railroad company and its employés, whether the method of carrying it out be elaborate or the opposite. And, in truth, we may, before going any further, assume that the essential feature of each particular of Mr. Adams' plan is a question of spirit. Not so much what railroad companies do for or to their men, but the way in which they do it is the matter to be settled. His third and main point, the impartial tribunal, is simply a method for working justice smoothly and seasonably instead of forcibly and with "bad blood," as by the custom which it is sought to supplant. It is indeed true that for a large company, like the Union Pacific, to spend $100,000 in a year for the benefit of its employés should be regarded as a comparatively small item, but the way in which it makes the expenditure is of the highest importance. A horizontal increase of pay may simply encourage lazy or unthinking men to soon demand still more, while all the good results expected may be attained by a much smaller sum if it is applied discriminatingly. It is familiar knowledge that a free ride costing the road almost nothing is appreciated by sensible employés at its true value to *them*, which may be fifty times the actual cost to the company.

A conference committee should be the normal means for meeting all seriously contested questions coming up between employer and employé. Such a committee should be regarded as a necessity on every road whose force of men is too large for the general manager to follow the old fashion of acquainting himself with all his men personally, and in fact is the only rational provision for bridging over changes of administration, even on small roads. Employés will desire to guard against fickle stockholders, just as surely as the owners will desire to look out for irresponsible workmen. The engineers on a prominent road lately said: "If we could be assured of the permanency of the present management, we should desire no grievance committee." But, as railroad managers, unlike government officials, sometimes die or resign, an organization not wholly dependent upon personal elements is necessary. This joint committee of directors and delegated employés should have the utmost stability and permanency possible to be given it, for the reason that a change in the administration of a railroad may constitute one of the most important crises in the relations of its employés to it. One of the greatest dangers to which a relief organization or an apprentices' school could be subject would be the accession of a new management possibly out of sympathy with it. This is apparent to any one who will consider the methods of some roads managed in Wall street.

Concerning the methods to be pursued by a body of this kind Mr. Adams says nothing, and there is perhaps nothing to be said. To formulate rules beforehand for its government would very likely be impossible. But a question at once suggested by the history of the Brotherhood of Locomotive Engineers is the propriety of employing hired spokesmen. Much of the success of the Brotherhood has been due to the conservative nature and the eminent fitness of its chief diplomatist. But men of skill, patience, and the varied resources necessary are not plenty on every road, and to bring in an advocate from outside of the force of employés would be taking a step not provided for in Mr. Adams' scheme. The professions of a president that he met the representative of the employés on perfect equality might not always avail to prevent the feeling of discontent which results from a conviction that the parties to a contest have been unequally matched. Possibly few bodies of men could be relied upon to select discreet men as attorneys, and quite likely they could find few men qualified for the place if they sought for one; but men who know themselves to be poor talkers ought to have the privilege of engaging assistance as freely as it was accorded to diffident lovers in the times of Miles Standish, even if they do, like the captain, wreck their own cause in using the privilege.

The whole success of Mr. Adams' plan hinges on the creation of the "permanent force" eager to retain their positions. This eagerness must be kept alive by decided pecuniary advantages; the mere freedom from unjust dismissal will not be enough, or at least it will not be a great advance beyond present conditions. To get the Locomotive Engineers to abandon the insurance feature of their brotherhood there must be a palpable advantage offered, and they cannot be hindered from assisting their brethren on other roads if they find it agreeable and believe it profitable to do so. The pecuniary consideration at once raises the question, Will the stockholder approve this? To make the cost of a hospital fund or of a steadily increasing payroll a "regular item of expense" is a vital point in the plan.

It is needless to speculate as to why railroad directors have not heretofore adopted so simple and excellent an idea as Mr. Adams now puts forth. The old and well-known reason, too exclusive attention to immediate financial results, trite as it is, about covers the case. When income has been good the general manager has settled all questions with a little money that was not missed. When hard times have come on the volcano has slept so quietly that its presence was unsuspected until it suddenly burst forth, and then there was no time for gentle methods. If directors do not now follow Mr. Adams' good advice it will be because they think that the Burlington strike has settled the question for a time. This is not the only feature in which directors are short sighted, as our readers know. If directors do not increase men's pay for length of service it will be because they feel confident that the hope of promotion will alone be enough to retain their devotion. This hope has been sufficient generally hitherto; but as our country fills up, and new openings on the frontier are fewer and fewer, this state of things will change. This principle of increasing the pay with the length of service is recognized as valuable. In the army, for instance, 10 per cent. of the "pay proper" of commissioned officers is added each five years up to a maximum increase of 40 per cent. after 20 years' service. But, if we are to judge by the past, most railroad directors will have to be very vigorously educated before they will apply the principle extensively.

Cost of Service as a Basis of Rates.

The relative cost of different classes of traffic is always worth studying. It is a necessary element in determining the general policy of a railroad with regard to rates. But it is not the sole factor in rate-making, nor, on the whole, the primary one. Any attempt to treat it as such is bad for the public as well as for the railroads.

People who try to base rates on cost of service alone, start from some entirely wrong assumptions. A correspondent, who has studied the various elements of cost with a good deal of care, states as an axiom that "all permanent traffic should share general expenses in due proportion." Let us see what would be the result of carrying this out to its logical conclusion. A railroad company sees a chance to develop a large coal traffic. This traffic will do little more than pay the direct expenses of handling it. Is the company to refuse to do it, simply because it does not pay its proportion of the general expenses, and is not likely to do so? This would obviously be a most short-sighted view. Cheap coal is a great indirect benefit to manufactur-

ers all along the line. Are these men cheated because they pay the general expenses of the road by their manufactured products which cheap coal has enabled them to produce advantageously? Would it be better for them not to manufacture at all, in order that somebody's cost-of-service principle may not be violated by carrying coal at a rate which leaves little profit?

This is not an unfair or exceptional instance. Railroad traffic has been developed by making a system of barely profitable rates for cheap goods which could not be moved at high rates, but could be had in large quantities at low rates. This added traffic, so far from causing other goods to bear extra burdens, has been a means of reducing rates all around. It has so increased the volume of railroad business that the proportion of general expenses has become relatively less for each shipment, even of those goods which have to pay more than their share of such expenses.

It is a very incomplete view of the subject to say that "the reduction in cost of carrying freight has been because of increased car-loads more than any other reason." This is simply one link in a chain of causes. More goods for each car, more paying weight for each locomotive-mile, and more traffic for each mile of track have combined to make lower rates possible. None of these things could have been fully developed alone. Each was in some sense dependent on the other. Better car and train economy made it possible to secure larger traffic; but larger traffic was what made it possible to utilize car space and locomotive power to advantage. A railroad which should confine attention to one branch of economy would soon find its possibilities in that direction limited. And a policy which should undertake to force all goods to bear a fixed proportion of the general expenses would involve a mistake of just this kind.

By giving the commercial department of a railroad freedom in developing business, we enable all these processes to go on side by side. By making it a mere servant of the operating department we prevent such progress. Of course, the result of the present system is by no means an ideal one. The railroad agent often goes to the extreme of recklessly disregarding cost, and makes rates which do his road harm. But in general it may be said that the test of the value of a reduction is to be found in its effect on earnings. If it increases volume of traffic fast enough to give a decided increase in gross earnings, the presumption is in its favor. If gross earnings increase faster than operating expenses, this presumption becomes a certainty. Whether the new traffic does or does not pay its proportion of general expenses or even of track maintenance is quite immaterial. The railroad and the public are better off with the reduction than without it.

The same set of considerations can be applied to passenger business. A system of rates based on cost of service would cause a universal increase in short distance passenger charges, and would practically stop the sale of commutation tickets on all but a very few roads. Yet, where American passenger traffic is profitable, the money has been made by the development of just such short distance traffic. The practical effect of basing passenger rates on an adjustment of mileage and terminal charges would be to prevent such traffic from being developed locally until a road was rich enough to reduce passenger rates all along the lines.

Of course, the chance for making reductions to develop traffic gives the freight agents a dangerous power. But the effort to base rates on cost of service is apt to have the still worse effect of preventing development altogether. The sensible thing to do is what the Inter-state Commerce Commission has done—more consistently in its earlier decisions than in its later ones—to admit that rates are to be based on the necessities of traffic rather than on relative cost, and to insist that this principle shall be applied equitably. Equal commercial needs must have equal recognition. This principle is hard to apply; but if consistently carried out it gives the traffic department of a railroad at once the necessary independence and the necessary control. It leaves it free to serve the public efficiently, and at the same time not free to sacrifice one section of the public to another. The advocates of cost of service as the sole basis of rates, in their anxiety to avoid the second would destroy the first also.

February Accidents.

Our record of train accidents in February, given in this number, includes 51 collisions, 62 derailments and 5 other accidents; a total of 117 accidents, in which 23 persons were killed and 88 injured.

These accidents are classified as follows:

COLLISIONS:	
Rear	29
Butting	15
Crossing and miscellaneous	7
	— 51
DERAILMENTS:	
Broken rail	9
Broken bridge or trestle	3
Defective switch	3
Broken frog	1
Broken wheel	3
Broken axle	4
Broken truck	1
Broken coupling	2
Worn tire	1
Rail removed for repairs	2
Bad switching	4
Cattle on track	2
Snow or ice	4
Unexplained	22
	— 61
OTHER ACCIDENTS:	
Boiler explosion	2
Broken parallel or connecting-rod	2
Explosion of dynamite	1
	— 5
Total number of accidents	117

The causes of collisions where given were as follows:

	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	4	..	1	5
Misplaced switch	3	..	..	3
Failure to give or observe signal	2	1	2	5
Mistake in giving or understanding orders	..	1	..	1
Miscellaneous	10	4	..	14
Unexplained	10	9	4	23
Total	29	15	7	51

A general classification shows:

	Collisions.	Derailments.	Other Accd'ts.	Total.	P. c.
Defects of road	..	16	..	16	14
Defects of equipment	5	11	4	20	16
Negligence in operating	22	6	..	28	24
Unforeseen obstructions	1	6	1	8	7
Unexplained	23	22	..	45	39
Total	51	61	5	117	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P.c.
Passenger	13	17	2	32	20
Freight and other	87	44	3	134	80
Total	100	61	5	166	100

The casualties may be divided as follows:

KILLED.	Collisions.	Derailments.	Other acc'ds.	Total.	P. c.
Employés	10	7	3	20	87
Passengers	..	1	..	1	4
Others	2	..	..	2	9
Total	12	8	3	23	100
INJURED.					
Employés	21	14	4	39	44
Passengers	10	36	3	49	56
Total	31	50	7	88	100

The casualties to passengers and employés, when divided according to the classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	..	12	2	7
Defects of equipment	..	3	3	8
Negligence in operating	1	7	15	20
Unforeseen obstructions and maliciousness	..	3	..	1
Unexplained	..	24	..	3
Total	1	49	20	39

Eleven accidents caused the death of one or more persons, and 28 caused injury but not death, leaving 78 (67 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with February, 1888 and 1887, shows:

	1889.	1888.	1887.
Rear collisions	29	30	24
Butting "	15	21	31
Crossing and other collisions	7	6	2
Derailments	61	104	67
Other accidents	5	13	8
Total "	117	174	132
Employés killed	20	21	21
Others "	3	7	34
Employés injured	39	99	51
Others "	49	65	55
Passenger trains involved	32	70	54
Average per day:			
Accidents	4.21	5.93	4.71
Killed	0.82	0.97	1.96
Injured	3.14	5.66	3.78
Average per accident:			
Killed	0.195	0.162	0.417
Injured	0.752	0.953	0.803

We find no report of any passenger killed in a passenger train this month. The one passenger killed was a drover. The two "other" persons were stealing a ride. One of the most startling derailments of the month, that near Ralston, Pa., is classed as unexplained, no information as to its cause having reached us. A derailment in the Rocky Mountains (9th) is classed as from defects of equipment, because the train broke in two; but we suspect that a true classification would place this clearly under the head of negligence. If dependence was placed upon "straight air" brakes alone there, would seem to have been a wrong principle followed at headquarters, while if the automatic was in use the statement that breakage of hose rendered the train unmanageable needs further explanation.

The collision and consequent fire at Boyd's, Me., which we have referred to before, is in some respects the worst accident in the February list, though the derailment of a switching engine at Springfield, Mo., on the 3d, is reported to have killed more persons. The Maine accident, though noticeable chiefly because of the burning of the cars and the special lessons it gives on the steam-heating question, should after all be first considered in its bearing upon the question of facing point switches and safe signaling arrangements. Fires in cars, bad as they are, very seldom involve danger until after the occurrence of a derailment or collision, and we shall have many supporters in our argument if we proceed on the theory that the prevention of the smash-up is the first duty, and that consideration of what happens afterward should be made secondary. This train was approaching an unprotected facing point switch at some 30 miles an hour. The view was either short from the curvature of the line or was obscured by the snow in the air, or both. The temperature was very low and the train was a little late. The common-sense view, one that would be given off-hand by a novice, and, in fact, the view held by many railroad officers, if we may judge by old rules still standing in many codes, would be to slacken speed under such circumstances. But this idea, honored as it is in time-table rules, is not followed much in practice; and why? This was a through line to be sure, but with only two through trains daily it cannot be classed as of the highest importance, and the competition to be met cannot be regarded as very sharp. If, however, making time was absolutely essential would it not be better to run very fast on the open road, so as to have time to spare at switches? One objection to this is the prejudice against irregular speeds or, rather, in favor of uniform speeds. But what are we to do? Must railroads continue to suffer the odium that is heaped upon them when a misplaced switch causes a disaster? The remedies ordinarily recommended are more switch attendants, double track, distant signals; but where a road cannot afford these and still insists on making quick time between termini, what is its proper course? Plainly to run trains more slowly at dangerous points and faster at others. The block system should be employed when snow is blowing furiously, but it will not provide against switches like this when the agent is in his office, and the switch handled by other men unfamiliar with it. It is true that the public demands roads before there is business enough to pay for running trains both safely and rapidly, but railroad directors cannot escape a large share of the responsibility.

The conductor who depends upon his engineer to see that the right to the road is not violated, who is still a numerous fellow, evidently was the cause of a collision on the 13th, where a watch was a little slow. The class of cases where the conductor perhaps cannot always obviate the consequences of the runners' blunder is exemplified by the collision at Tuckahoe, Va., on the 3d. The conductor may fully understand his order in such a case as this, and intend to see that it is carried out, but unless he is alert on the instant he may let the train run 50 or 100 rods too far, which may cause a bad collision. Only the very best discipline will make men alive to the danger they are liable to in circumstances of this kind.

Two freight derailments reported as unexplained were clearly attributable to either bad track or bad trucks, but no one can apportion the fault. The trains were pulling out of a poorly laid side track and certain cars would not turn the curve. The cars were good enough for good track and the track was good enough for good cars, so that the blame must be laid on both road and car departments or else upon neither. A clearer case was the derailment at a frog near New Britain, Conn., the 27th, where it is explicitly stated that the frog was all right, but the driving tires very old and worn. If all reporters inquired into causes as closely as was done in this case, the list of "unexplained" derailments would not need to be so long as it sometimes is.

The worst accident, in February of which we have any account was that at St. George, Ont., on the 27th, which, being outside the United States, is not included in our record. It was described in the *Railroad Gazette* of March 8. Among other accidents in Canada was a crossing collision at Brampton, the 27th, where a Grand Trunk freight train cut through a Canadian Pacific freight without being derailed nor scarcely slackened. The engineer and fireman jumped off and the train ran two miles before the brakeman stopped it. Near Rockwood, Ont., a night express ran 1½ miles with a broken wheel and safely crossed a long bridge. The special value of the block system in winter is illustrated by a collision near Guelph, Ont., the 12th, where a man was sent out with a red light to protect a train stuck in the snow, but was not seen. Similar collisions will be found in our account under date of 7th, 19th and 22d. The serious passenger train collision at Boyd's Siding, Me., was also owing partly to the runner's view being obscured by snow. In Mexico the Montezuma special was derailed at Baretaran on the Mexican International the 19th, and one of its palatial cars had to be left at Piedras Negras. Train wreckers tampered with a switch, the reports said. A train on the Interoceanic with President Diaz on board was derailed "by an obstruction" about the same time.

Annual Report.

Cleveland, Columbus, Cincinnati & Indianapolis System.—The earnings and expenses of the roads constituting this system (Cleveland, Columbus, Cincinnati & Indianapolis, Cincinnati & Springfield, Indianapolis & St. Louis) are as follows:

	1888.	1887.
Earnings, freight	$4,958,639	$5,417,940
" passenger	2,160,804	2,006,237
Total, including miscellaneous	7,611,412	8 056,008
Operating expenses	5,329,727	5,235,730
Net earnings	2,281,685	2,820,278
Taxes, interest and rentals	1,891,691	2,023,276
Balance	389,993	797,001

From this balance a dividend of 1¼ per cent. was paid on the capital stock of the company in February, 1889.

Like so many other roads, this system shows both a decrease in revenue and an increase in expenses. Part of the apparent decrease in revenue is due to a change in methods of accounting; but there still remains a real loss of $309,000 in actual earnings. The decrease in freight earnings was $459,000; the increase in passenger earnings $155,000.

The fall in freight earnings was mainly due to decreased

rates. The freight statistics for the two years were as follows:

	1888.	1887.
Tons	5,784,055	5,895,924
Ton-miles	715,286,000	727,814,000
Rate per ton-mile	0.693 cts.	0.744 cts.

The low rates were due to the war of tariffs, which began with live stock, and extended over a large proportion of the traffic. The loss from this source is estimated at $364,000.

Passenger statistics are as follows:

	1888.	1887.
Passengers	3,174,875	2,740,962
Passenger-miles	106,269,000	91,778,000
Rate per mile	2.033 cts.	2.186 cts.

Here the increase in traffic was so great as much more than to make up for the reduction in fares. The receipts from this source were larger than in any previous year of the company's history, and the volume of traffic very much larger.

The increase in operating expenses was due to unusual repairs of equipment.

The capital amount is as follows:

Stock outstanding	$14,991,600
Bonds	10,437,000
Current liabilities	803,007
Surplus	566,104
	$26,807,711

The surplus shows an apparent reduction of four and a half million dollars; but this is due to a readjustment of the capital account recently rendered possible by a decision of the United States Supreme Court in favor of the C. C. C. & I., in its suit against the St. Louis, Alton & Terre Haute. There is no actual loss, but simply an improved method of statement.

The changes proposed at the recent conference of railroad commissioners for the form of annual report to the Inter-state Commerce Commissioners are trifling. The division of all expenses as "chargeable to freight or passenger business," even when they cannot be distributed in this way, still continues. No change has been made by which material and supplies are to be counted as current assets; provision has simply been made that they may be appended as a note in the table. The railroad men tried to secure some change in both these respects, but without success. About the matter of freight and passenger distribution we are sorry. As for the current liability balance, that is not of much use any way; so that if, as between two equally inexpensive forms, the Commissioners prefer one rather than another, we see no reason why their wishes should not be gratified. Such detailed changes as have been adopted make the blank a little more explicit, but do not alter it in any essential features. The provision to have state reports made for the year ending June 30—the same date as those of the Inter-state Commission—is good. We trust that this will be the beginning of still greater uniformity in state and national requirements.

In the *Railroad Gazette*, June 5, 1885, was published a description, with full working drawings, of the single bell chime whistles, which have since come largely into use on locomotives. As the drawings were furnished to us by the railroad company using the whistles, without information of patented features, we had no means of knowing that it was a proprietary article. This has given rise to the impression that the device is public property, and at least two railroad companies have, in consequence, been manufacturing them for their own use. Others may be similarly misled, our drawings being complete and correct enough to work from, and as further loss and annoyance may be thereby caused to the owners, we desire to state that the single bell chime whistle is covered by patents dated Jan. 30, 1877, and Sept. 2, 1884, and that the Crosby Steam Gauge & Valve Co., of Boston, is the sole licensee and manufacturer, and no others have the right to make it. This correction has been made once before, but the pursuit of an error is a stern chase and a long one.

Probably neither the Canadian Pacific stockholders nor those of the transcontinental roads south of the border are greatly alarmed by the latest news from Victoria, B. C. That news is that a bill is before the legislature of the Province to incorporate the "Western Transcontinental Railroad, which is to be the first link in the second through Canadian railroad." The capital is "fixed at $50,000,000, with power to increase." Naturally the Grand Trunk is said to be behind this fine scheme. Considering the condition of the Canadian Pacific in particular, and of the transcontinental business in general, nothing in the way of railroad schemes seems much less likely to be carried out than another through line still further north.

A committee of the Western Society of Engineers has under investigation the practicability of making translucent, profile and cross-section papers for blue printing. The committee has found that one manufacturer will furnish profile paper on thin bond paper for 75 cents a sheet of 21 × 23 in. We find that profile ruling can be had in this city on tracing cloth for $1 per sheet. The chairman of the Chicago Committee thinks that it can be supplied for 30 cents per sheet on bond paper, or 60 cents on tracing cloth, and proposes to experiment to that end if satisfied that there is a sufficient demand for the material. We should suppose that there could be no doubt of the demand.

The news comes from Lima, Peru, under date of March 24 that the famous Verrugas viaduct has been swept away by a flood. It is thought very unlikely that it should have been destroyed in this way, for a flood has been unheard of there for hundreds of years. It may, however, have been wrecked by rocks falling from the mountains above.

NEW PUBLICATIONS.

Elements of Machine Design. By J. F. Klein, Professor of Mechanical Engineering, Lehigh University. The Comenius Press, Bethlehem, Pa.

The title of this work is to some extent a misnomer, as it naturally leads one to suppose it a treatise on the designing of machines. In the preface, however, the purpose of the book is restricted to the "designing of the most important of the machine parts that occur in practice," and the further statement is made that it is not a complete treatise even on the "machine parts" represented, frequent reference being required to the larger works of Reuleaux and Unwin. Had the author given his book some other name, for instance, "A Treatise on Mechanical Details," or simply "Mechanical Details," he would have more nearly expressed its import and contents, for the work is not strictly upon design at all, and machine parts is not at present an English expression nor is it likely to become one.

Prof. Klein begins his task with certain sections upon the various fastenings in use, viz.: Screw threads, bolts and nuts, setscrews, etc.; the rivets and joints for wrought-iron and steel plates; keys, gibs, cotters, etc. Each section is illustrated by a plate very neatly and carefully prepared, printed on bond paper, giving examples of the various forms discussed in the test. The plates are not numbered, as they ought to be, for the sections to which they refer. The references to the plate might have been much simpler. Instead of using a long list of symbols for the various dimensions and proportions of the "machine parts" represented, it would have been, in many cases, easier and shorter to repeat the words symbolized.

The processes are usually well explained, and the matter regularly progressive, as it should be. The author has evidently given much attention to the best modern practice and books, and the mathematical work is well and thoroughly done.

The value of the book would have been much enhanced both for student and teacher had Prof. Klein given briefly the additional forms and methods for which, in many cases, he refers to Releaux and Unwin, such as forms of keys and methods of securing them other than those described in Section V.

In the sections upon toothed wheels and gearing the same system of reference is continued. With the expenditure of very little more space and labor this book might have been made to embody briefly the principles elucidated so ably by Willis, Rankine, Unwin, Reuleaux, etc. Nothing is said of Camus, the first great mind that laid down clearly the correct principles of gearing, which were afterwards put into practical shape by Willis and others.

Section X. discusses worm gearing in the same way. We were astonished to find in this section no reference to the variation of worm gearing called "spiral gearing," used by many good builders, sellers especially, for planing machines, etc. Sections XI. and XII. on the contrary, which treat of belting, pulleys, cone pulleys, etc., are most thoroughly worked up, and are complete in themselves. We have seen nothing on the subject better presented or more ably handled. The carefully prepared tables are a valuable portion of this section. Sections XIII. and XIV. contain the standard information on shafts, pivots, bearings, journals, connecting rods, etc., arranged in every convenient shape. A good index follows, and the volume is then completed by a series of nine tables on bond paper, carefully worked out and beautifully executed, for laying out profiles of gear teeth of all usual curves. These tables are a novel and peculiar feature of great value in such a treatise. Prof. Klein may be congratulated upon their conception and introduction.

Proceedings of the Sixth Annual Convention of the Roadmasters' Association of America, and *Proceedings of the Sixth Annual Convention of the New England Roadmasters' Association.*

The valuable reports of the meetings of these two bodies are now received in pamphlet form. That of the national association contains several illustrations of the standards recommended by the committees at the conventions. The proceedings of both conventions were published at considerable length and discussed in these columns last fall, and there is no occasion to say anything more about them at this time.

Annual Report of the Minister of Railways and Canals of the Dominion of Canada, for the Fiscal Year ending June 30, 1888.

This report, the scope and form of which are well known to many of our readers, comes to us through Mr. Collingwood Schreiber, Chief Engineer and General Manager of Government Railways. According to the report the year was marked by much activity in railroad construction, while the receipts of the roads already in operation show a degree of prosperity exceeding anything heretofore reached in Canada. Thirteen new lines were added to the list of Canadian roads, making a total of 64 companies. At the close of the year there were 12,332 miles of completed railroad. The capital paid in, including government and municipal aid, amounted to $683,773,191, equal to $55,500 per mile of road. The gross earnings amounted to $38,842,000, or $3,150 a mile, having increased nearly $5,500,000 over the previous year. The net earnings were $11,217,327, or $900 a mile. The operating expenses are 71 per cent. of the gross earnings. But 10 passengers were killed in the year's operations, and in all cases death was due to the carelessness of the victim.

A Brief History of Patent Legislation in the United States. By D. Walter Brown, Ph. D., 128 Broadway, New York.

This pamphlet presents in condensed form information of use to inventors and intending investors in patents. A summary of all the American Statutes is given, from the Act of 1790 down to the present time, and the salient features are presented of the growth of the patent system to its present state. The pamphlet is a handy book of reference for those whom it is intended to serve. It may be obtained of the newsdealers.

TECHNICAL.

Locomotive Building.

The Schenectady Locomotive Works have recently received an order for building several locomotives for the Fairhaven & Southern road, now building.

The Georgia Southern & Florida has recently ordered eight new locomotives.

The Rhode Island Locomotive Works, of Providence R. I., have recently delivered 10 locomotives to the Savannah, Florida & Western, seven to the Brunswick & Western, and five to the Charleston & Savannah.

Bridge Notes.

The Toledo, Ann Arbor & North Michigan is erecting a bridge over the Manistee River, which is 65 ft. above high-water mark and has a 200 ft. span. The approaching trestle is 1,500 ft. long.

Bids for a wrought-iron highway bridge over the canal on Cabot street, Holyoke, Mass., are called for. This bridge is 110 ft. long in two equal spans, and 60 ft. wide.

The Champion Bridge Co., of Wilmington, O., was last week awarded a contract to build a 120 ft. iron bridge across Slate Creek, at Jeffersonville, Ky.

Bills have passed the Colorado Legislature providing for the erection of bridges across Grand River, in Eagle County, near the mouth of Rock Creek, and for a bridge across Grand River at Glenwood Springs, in Garfield County.

Three new bridges are to be built across the Arkansas River at Pueblo, Col., by county and private subscription.

The Tennessee & Ohio last week completed a new Howe truss bridge over Holston River. The bridge has two spans of 375 ft. each.

The contracts for the bridge at Belleville, Ont., have been awarded as follows: Brown Mfg. Co., Belleville, superstructure, $36,835; McNeely & Walters, Lindsay, superstructure, $48,224.95; total, $85,049.95. The bridge will be 1,971 ft. long, exclusive of the approaches.

Ross & Sanford, of Baltimore, have under way bridges over the Chowan and Roanoke rivers for the Norfolk & Carolina road, now building. The bridge over the Chowan River has an iron draw and 2,000 ft of piled trestle work. The bridge over the Roanoke River has four spans, the iron draw being 200 ft. long. The piers are masonry, the superstructure of iron, and the approaches on each side consist of 3,000 lineal ft. of trestle, piled.

The New Westminster, Southern & Bellingham Bay Ry. & Nav. Co. has called for tenders for the construction of a swing bridge, with a 200 ft. span, over Nooksack River at Kingsboro, W. T.

The City Bridge Co. has been reorganized at Pittsburgh, Pa., by George E. Wilson, Joshua Rhodes and others of Pittsburgh to build a bridge over the Allegheny River between Pittsburgh and Allegheny City, for the use of the cable road.

Manufacturing and Business.

The Manhattan Elevated road in New York has given the Gold Car Heating Co. an order to equip all the cars on the four lines of the system with the improved Gold coupler, with automatic traps. The coupler has been tested during the past winter on two of the lines.

The Thurmond Car Coupling Co. has resumed control of its patents, and has been experimenting with and perfecting its coupler, which is the M. C. B. type, and the company will shortly offer couplers of its approved design. The principal offices of the company will be in New York city, with a branch office at 802 F street, Washington.

Among the recent sales made by A. B. Bowman, of St. Louis, dealer in machinery and machinists' tools are: Large engines to Portia, Ark.; to Eureka Springs, Ark., and to Mexico; three large Vulcan hammers were sold in St. Louis, and a complete machine shop outfit at Topeka, Kan., consisting of lathes, planer, engines and boiler, drill press and small tools for machine and blacksmith shop. A heavy order has also been placed with Mr. Bowman by the Missouri Pacific.

The Phœnix Railway Supply Co., 15 Cortlandt street, New York, has been appointed General Eastern Agent for the Mardeu Brake Beam Co.

Wm. Sellers & Co., of Philadelphia, are having an erecting shop built on their grounds, which will be 115 ft. by 150 ft., with a height of 24 ft. to the eaves. The roof is to be supported on three rows of heavy iron columns, one row of which will be in the centre. The walls are to be of brick and 17 in. thick, and the floor laid in concrete. The building will be erected by R. C. Ballenger & Co.

The Ingersoll-Sargeant Rock Drill Co., has, within a week since its organization by the consolidation of the Ingersoll and Sargeant Companies, sold three large tunnel plants, comprising five air compressors, five air receivers, four boilers, pipe, etc. Besides these the company has received orders for several mining plants, and during the week has sold five stone channeling machines, and has recently made foreign shipments to Mexico, Wales and British India. Complete quarrying outfits, comprising hoisting engines, boilers, drills, pumps, etc., have been shipped to North Carolina, Pennsylvania and Indiana. It is stated that every tunnel now under construction in the United States is driven exclusively by Ingersoll or Sargeant machinery.

The fencing on the extension of the Chicago, Kansas & Nebraska to Colorado Springs has been recently completed by the Western Fence Co., of Chicago. The work required nearly 2,000 lineal miles of five wire fence with wings and gates.

At a meeting of the board of directors of the Eames Vacuum Brake Co., held at Watertown, N. Y., March 20, R. C. Vilas was elected First Vice-President and Mr. A. P. Massey Secretary, vice James H. Slade, resigned.

Gould & Eberhardt, of Newark, N. J., have been awarded the contract for furnishing the Navy Department at Washington, D. C., with an Eberhardt automatic gear cutter. There were several bids lower than that of Gould & Eberhardt.

The Lehigh Valley road has let a contract for a 40-ton Thornberg derrick for the Tifft Farm terminus at Buffalo.

Mr. H. T. Hanna, formerly General Freight Agent Pittsburgh, Marion & Chicago Railroad, will have charge of the Freight Department of the Globe Sewer Pipe Co., and all matters pertaining to freight, rates, claims, etc., should be addressed to him at Pittsburgh. This company has a capacity for producing 150 car loads of pipe per day.

The Deoxodized Metal Co., of Bridgeport, Conn., has recently made bronze name-plates for engine builders, machin-

ists and manufacturers, among those supplied being the Westinghouse Air-Brake Co.; the Lane & Bodley Co.; the Eagle Iron Works, Detroit; Russell & Co., of Massillon, O.; the Benham Hydraulic Motor Co.; of Providence; the National Water Purifying Co.; the Ellithorpe Air Brake Co.; Union Machine Co.; Strong Locomotive Co.; H. R. Worthington; the Vulcan Iron Works Co. A specialty of the company is the production of anti-friction metals and babbitts and an alloy for a wide range of castings, like cylinders, pumps, bells, car trimmings, journal bearings, tuyeres for blast furnaces.

A. L. Ide & Son, Springfield, Ill., have received an order from the Union Iron Works, of San Francisco, to deliver within three weeks two Ide engines of 150 H. P. each and one of 100 H. P. They have received orders for 10 engines in the last two weeks, all to be delivered within 30 days.

The Otley Mfg. Co., of Chicago, manfacturers of Otley's Eureka steam packing cement, has recentiy made a number of shipments to the following railroads: The Chicago & Northwestern, Chicago, Milwaukee & St. Paul, Chicago, Burlington & Quincy, Lake Shore & Michigan Southern, New York, Susquehanna & Western, Terre Haute & Indianapolis, Missouri Pacific, Grand Rapids & Indiana, Ohio & Mississippi, Michigan Central, International & Great Northern, Boston & Maine and others.

The Standard Car Heating & Ventilating Co., of Pittsburgh, re-elected the old officers at the annual meeting last week.

The Chicago Roller Bearing Car Truck Co. has been organized in Chicago, by W. J. Cooke and others, with a capital stock of $250,000, to manufacture car trucks and running gear.

The New Process Twist Co., of Taunton, Mass., has been reorganized with B. L. Dwinell as President, and J. E. Pope as Superintendent. New machinery has been added, and the capacity of the factory greatly increased.

Iron and Steel.

The United States Rolling Mill at Anniston, Ala., has orders for 100 axles and 100 wheels for the South Carolina road, and for 5,000 axles for the Savannah, Florida & Western.

The Harvey Steel Works, at Newark, N. J., which were built to work on the Harvey patents, began rolling early last week.

Some extensive improvements will soon be commenced at the Edgar Thomson Steel Works, of Carnegie Brothers & Co., Limited, at Braddock, Pa. A new 10 ton converter will be put in, in addition to those already in use. Several new devices will be introduced, which will permit of considerable saving in skilled labor. New machinery will be placed in the blooming mill, which will greatly increase the capacity of the works. A rail saw to cut three rails per minute will be added.

The rolling mill of the Kittanning Iron Co., Limited, of Kittanning, Pa., which has been idle for about two months, resumed operations last week.

The Long & Jervis Foundry & Machine Co. have removed from Decatur to Florence, Ala. Contracts have been made for three buildings, a machine shop, foundry and blacksmith shop.

The Ellis & Lessig Steel & Iron Co., of Pottstown, Pa., has broken ground for 12 additional puddling furnaces. The contract for the castings, amounting to about 150 tons, has been given to the Colebrookdale Iron Co., of Pottstown.

Pickands, Mather & Co., agents for the Minnesota Iron Co., the Chandler Iron Co. and the Colby, Milwaukee and North Champion mines, have opened an Eastern office at 222 South Third street, Philadelphia, with Edmund D. Smith & Co., as agents.

An iron and brass foundry will shortly be established at Apollo, Pa, by Casper Kettering and others. At present facilities will be put in for making 6 and 8 ton castings. Two 10-ton and one smaller steam cranes will be put up at once, and two cupolas of from 5 to 8 tons capacity.

The Secretary of the Navy has approved the report of the trial board of the new gunboat "Yorktown," and the vessel, including her fittings and machinery excepting the electric-lighting plant, will be accepted subject to the special reserve until the electric light plant has been tested and approved.

The Indianapolis Car & Mfg. Co., was last week awarded a contract to build 500 fruit cars for the Louisville & Nashville, and 100 box cars for the Jacksonville & Southeastern.

The United States Rolling Stock Co., has been awarded a contract to build 210 freight cars for the Suwannee road of Florida.

The Huntington Mfg. Co., of Huntington, Pa., has received an order from the Western & Atlantic for 200 iron cars of the pattern made by the Iron Car Co., of New York.

The Newburyport Manufacturing Co. is working on orders for 25 cars, mostly for roads in Massachusetts.

The Georgia Southern & Florida has recently contracted for 800 box and platform cars and for several passenger cars.

The Georgia road has just completed new shops fitted with a wheel plant and several new improvements. The construction of 100 freight cars will shortly be commenced. The car department is fitted with wood-working machinery from J. A. Fay & Co., of Cincinnati, and Greenlee Bros. & Co., of Chicago.

The National Tube Works Co., of McKeesport, Pa., has purchased for about $600,000 over 30 acres of land adjacent to that occupied by the present plant. The company will erect additional blast furnaces.

The Rail Market.

Steel Rails.—No business is reported either in the east or the west, with the exception of a few small lots, and very little business is in sight. Eastern mills quote $27@$27.50 for large lots, and quotations at Chicago are $30@$30.50.

Old Rails.—In the east quotations are nominally $23 for tees. At Chicago old iron rails are held at $21.25@$21.50, with little demand, and at Pittsburgh sales have been made at $23 and $23.50. Old steel rails at Pittsburgh are quoted at $17.50@$18 and at $19@$20, according to length.

Track Fastenings.—In New York spikes are quoted at $2 @$2.05 and angle bars at $1.75@$1.85, delivered.

Thick or Thin Tires.

The Master Mechanics' Association Committee on Tires, Messrs. H. Schlacks, C. E. Smart and J. W. Stokes, has sent out the following circular:

Please furnish a tabulated statement showing the lifetime of a series of heavy and light tires of the same make.

Give figures showing the amount of wear to tires occasioned in handling engines by different engineers.

Do not heavy wheel centres with thick tires produce flat spots upon the tread of tires much sooner than light wheel centres with light tires? If so, please send a statement showing this difference.

In determining the advantage of a thick over a thin tire, or vice versa, do you take into account the expense of turning tires?

To what extent does the condition of tires influence the taking of an engine into shop for general repairs?

What is the cost at your shop of disconnecting an engine, taking out wheels, turning tires, and replacing wheels ready for services?

In conclusion, state the reason why you think a heavy tire better than a thin one, or vice versa.

The brand of tires will be regarded by the committee as strictly confidential.

Replies to be sent to Henry Schlacks, Superintendent of Machinery, Illinois Central Railroad, Chicago, Ill.

Water Space of Locomotives.

A committee of the Master Mechanics' Association has sent out the following circular:

The average amount of steam evaporated from a given amount of coal burned is usually, in the ordinary locomotive boiler, only about one-half of what a perfect utilization of the heating properties of the coal should accomplish. It is believed that much of this waste of heat is due to a restricted circulation of water in the boiler, that is, owing to inadequate passages for the water, the latter is unable, under certain conditions, to maintain its continuity with the heated sheets.

To the end that this subject be investigated, and that a report be made based on practical results, the undersigned committee ask your kind attention and answers to the following questions:

Do you think the water space usually allowed between inner and outer sheets of a locomotive fire-box sufficiently large to permit a free circulation of water in contact with the heated sheets under circumstances of a high temperature in fire-box?

Have you made any experiments to demonstrate your conclusions? If so, please state particulars.

Can you suggest a means whereby a better circulation of water in the space surrounding the fire-box would be assured?

If you suggest a change in shape of the fire-box sheets to accomplish the purpose, will such change interfere with the space in fire-box allotted for combustion?

What width of water space do you suggest as being sufficient between the inner and outer sheets of fire-box?

Do you consider the clearance space usually allowed between the boiler tubes of a locomotive sufficiently large to permit the highest evaporative power at that point under condition of the maximum heat in fire-box?

Assuming the boiler tubes to be two inches outside diameter, what clearance space do you allow between them?

Do you prefer placing boiler tubes in flue sheets in line vertically or situate them zigzag fashion? Please state your reasons for the preference.

Do you favor the use of ordinary crown bars placed in the usual manner for staying the roof sheet of fire-box? If not, please state objections.

Have you adopted a system of radial stays for crown sheet, or any method of staying said sheet differing from the old style crown bar? If so, please send the committee a sketch showing the manner in which it is done.

Do you favor the use of flat or circular crown sheets for locomotive fire-boxes, and which method do you regard the most efficient for transmitting heat?

Please do not confine yourself entirely to the questions asked, but give the committee any information or drawings you may possess tending to improve the evaporative efficiency of locomotive boilers.

JOHN HICKEY,
J. N. BARR,
R. W. BUSHNELL, } Committee.

Replies to be sent to John Hickey, Master Mechanic Mil., L. S. & W. Ry., Kaukauna, Wis.

The Pennsylvania Shop Committee.

The shop Committee of the Pennsylvania system, which has in charge the recommendation of machinery and equipment for the new Altoona shops, spent three days last week in visiting machinery manufacturers in Ohio, with a view to determining the comparative merits of the various makes of machines and tools. The party consisted of A. S. Vogt, Mechanical Engineer Pennsylvania Railroad, Altoona; G. W. Stratton, Master Mechanic, Altoona shops; W. E. Hall, Altoona; G. L. Potter, Master Mechanic, Fort Wayne shops; H. D. Gordon, Master Mechanic, Wilmington shops, and W. Swanston, Master Mechanic, Indianapolis shops. On Tuesday, the plant of the Niles Tool Works, Hamilton, Ohio, was inspected. President Gordon and Secretary McKinney did the honors of the occasion, Mr. Gordon entertaining the party at dinner at his home. The same evening a run was made to Cleveland, where the Otis Iron & Steel Works, the machinery works of Warner & Swasey, the works of the Acme Machinery Co. and of the Paige Car Wheel Co. were visited, Mr. J. H. Bole, of the first-mentioned concern, acting as guide and host. Thursday was spent at Alliance, O. Here the plants of the Morgan Engineering Company and the Solid Steel Company were the special points of interest. A dinner at the Russell House, a ride upon the new Thomson-Houston electric railroad and a visit to the power house completed the day. The members of the committee left for their respective homes on the evening trains.

The other eastern states having already been disposed of, New England will next be visited by the committee. This done, the work will be reduced to consultation work in deciding on the proportionate prices and efficiency of the various bidders on similar lines of machines. It is the intention to have the new shops completed by next fall, but if this is accomplished, it will be a feat little short of marvelous, as only the foundations are completed at this writing.

The Hartford Steel Tie.

The A. J. Hartford Steel Railway Tie Manufacturing Co., of Temple Court, New York City, has closed a contract with the Pennsylvania Steel Co. for the manufacture of the Hartford tie. Arrangements will be made also within a few months for the manufacture of this tie in the west. Several orders are booked, and it is expected that they will be filled speedily. This tie was very fully illustrated and described in the *Railroad Gazette* of Dec. 7, 1888.

A New Stations.

Plans for the enlargement of the Broad Street Station of the Pennsylvania, in Philadelphia, are now in the hands of the Chief Engineer, and will be completed in a few months, when work on the station will be begun. The Pennsylvania owns the property on the north side of Market street, on which a new two-story freight depot will be erected. The first floor will be used for trucks, drays and freight matter, and the cars will be on the second floor. The freight offices also will be removed to the new building. The station will probably be finished this year, and the company will then carry out its plans for the enlargement of the Broad Street Station.

A Mammoth Wrecking Car.

At the works of the Marion Steam Shovel Company, Marion, O., there is in course of construction, and about ready for delivery what is said to be the strongest railroad wrecker ever built. The builders of the machine have guaranteed it to lift 50 tons in service. It will be tested about April 10, and on being accepted will be delivered to the buyers, the Chicago & Atlantic Railway. One special feature of the wrecker is the arrangement of the forward truck which, of course, bears the major portion of the weight of the machine. This is a double truck, that is two standard trucks, with arch cars of increased dimensions, framed together so as to make in reality an 8-wheel truck. Each truck has its center bolster so as to act independently of the other in rounding sharp curves or taking sidings, while the combined truck has a secondary or upper bolster on which rests the car itself.

The works of the Steam Shovel Company are full of work, and it is with difficulty that orders are filled promptly enough to satisfy the proprietors.

THE SCRAP HEAP.

Notes.

The Ohio & Mississippi has put on an express train between Cincinnati and Louisville which is scheduled to run through in 3 hours and 20 minutes each way. The distance as shown in the official guide is 130 miles, and it is reported that the trains are to make 7 stops. This will require a rate of about 39 miles an hour, including stops, and is about 50 minutes quicker time than that made by the fastest train heretofore run.

Robert Craven, Treasurer of the Philadelphia, Wilmington & Baltimore and some of its controlled lines, was dismissed last week in consequence of the discovery of an embezzlement of about $5,000 in the accounts of the Junction Railway, of which he was also treasurer. For a period of about two years certain incidental receipts had been omitted from the accounts, and the defalcation was first discovered by the auditors noticing a somewhat uniform diminution in the miscellaneous receipts of two or more companies of which Craven was treasurer. It appears that the auditors had, in making examinations, taken his word for certain small items.

Levi Lewis, about 70 years old, engineer of a fast express train on the New York Central, dropped dead on his engine, of heart disease, near Chili, N. Y., on the evening of March 25.

The Louisville & Nashville is to adopt Giles' time inspection system.

Engineer Major, of the second Mud Run engine, and flagman Hannigan, of the preceding train, were acquitted at their trial in Mauch Chunk, last week.

It is reported from Warsaw that the newly-appointed Russian Minister of Communications has ordered all the railroad managers in Poland to send him lists of those employés who are Catholics or Jews. Since the accident at Borki, which nearly cost the Czar his life, all employés on the Russian railroads are required to belong to the Orthodox Church, but this is not possible in Poland.

The Baltimore & Ohio will soon build a large coal wharf at Snyder-ave. and the Delaware River, in Philadelphia, on property owned by the company. The new wharf is designed to afford facilities for increasing seaboard shipments of Cumberland soft coal.

Baltimore & Ohio Relief Department.

President Mayer, of the Baltimore & Ohio, has issued a a circular to employés, citing the fact of the abolition of the B. & O. Employés' Relief Association by the Maryland Legislature, taking effect April 1. The board of directors have established a relief department, which is practically the same as the present association. The new association is not compulsory upon any of the employés. When an employé became a member of the association he signed an agreement not to enter suit against the company in case he was injured or killed. If he was killed his family could not sue the company on this account.

Among the changes in the new association is one in the natural death benefit guaranteed members, which has been raised from $100 to $250. The payment will be made only to the member's widow, children or nearest kin. Members who have received sick benefits for twelve weeks or longer are permitted to resume work without a medical examination. None of the benefits can be attached for the payment of a member's debts. The limit of ten miles for free transportation of children attending daily school is removed. All other members of the family depending upon the member for support can travel over the lines at one-half the regular rate. Any member of the association who becomes disabled by accident will be given a position he can acceptably fill. No benefits will be paid for the first six working days of a member's disablement by sickness. Of the $300, the natural death benefit, only $100 is guaranteed by the company.

Taxes on Sleeping Cars.

The bill for taxing sleeping and dining cars in Nebraska has become a law. It provides that the boards of equalization shall assess against the owners of cars the average number used each month, the assessed value to bear the proportion to the entire value that the monthly average number of miles that such cars have been run or operated within the state bears to the monthly average number of miles that they have been used or operated within and without the state.

Tramps Capturing a Train.

A large party of tramps boarded a freight train on the Pittsburgh & Lake Erie, near Alliquippa, Penn., on the night of March 23 and for five hours held the train, refusing to allow the crew to move the train unless permitted to ride on it. A special train with officers was sent to the rescue. Twelve tramps were arrested, but a number of others escaped.

Australian Exhibitions.

The last number of the *Colonies and India* gives a partial list of awards at the Melbourne Exhibition. The Americans who have received awards are as follows: First order of merit, Brooklyn Watch Case Co., California Glue Works, Elgin Watch Co., Glen Cove Starch Co., Simpson, Hale & Miller, Wallingford, Conn., electroplate; T. Evans & Co., Pittsburgh, lamp chimneys; Whiting & Sons, Boston, paint brushes; to which should be added Westinghouse brakes, though they are credited to London. In the second order of merit are Adams & Co., Pittsburgh, ordinary glass wares; Emmerson's Albuminoid Food, New York; Kalamazoo Railroad Tricycle Co. And in the third order are Ansonia Clock Co., Sargent & Co., Newark, harness mountings, and J. Wilson, of Erie, Pa., for horse nets.

Although the exhibition is officially closed it is to be kept open for a month longer. The Victorians are troubled by the curtailment of their space at the Paris exhibition from 19,000 to 13,000 sq. ft. This, they claim, will only allow the exhibition of their natural products, wine, wool, cereals and timber. It is proposed to make the exhibition of wine a very important one.

South Australia.

South Australia now has 1500 miles of railroad open to traffic. The number of passengers carried last year was 3,867,000, 891,038 tons of freight were moved, and the total receipts were £877,577; length of haul not stated.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Rock Island & Pacific, quarterly 1 per cent., payable May 1.

New York & New England, semi-annual, 3½ per cent. on preferred stock, payable May 1.

Norfolk & Western, semi-annual, 1½ per cent., payable April 25.

Southeast Pennsylvania, 5 per cent., payable March 30.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atchison, Topeka & Santa Fe, annual meeting, Topeka, Kan., May 9.

Cairo, Vincennes & Chicago, special meeting, Cairo, Ill., April 25.

Calabas, Tucson & Northwestern, annual meeting, 32 Liberty Street, New York, April 2.

Chesapeake, Ohio & Southwestern, annual meeting, Memphis, Tenn., April 1.

Chicago & Alton, annual meeting, Chicago, Ill., April 1.

Colorado Midland, annual meeting, Colorado Springs, Colo., April 1.

Lake Shore & Michigan Southern, annual meeting, May 1, Cleveland, O.

Louisville, Evansville & St. Louis, special meeting, Mt. Vernon, Ill., May 20.

Michigan Central, annual meeting, May 2.

New York, Ontario & Western, special meeting, 16 Exchange place, New York, April 3.

New York Central & Hudson River, annual meeting, New York City, April 17.

Tennessee Coal, Iron & Railroad Co., annual meeting, Tracy City, Tenn., April 1.

Toledo, Ann Arbor & North Michigan, annual meeting, Toledo, Ohio, April 17.

Valley (Ohio), annual meeting, Cleveland, Ohio, April 17.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Association of North American Railroad Superintendents* will hold its spring meeting at 46 Bond street, New York City, April 8.

The *General Time Convention* will hold its next meeting at the Hotel Brunswick, New York City, April 10.

The *Train Dispatchers' Association* will hold its second annual convention in Indianapolis, Ind., June 12. E. J. Peabody, 237 Franklin street, Chicago, is Secretary.

The *American Railway Master Mechanics' Association* will hold its next annual convention at Niagara Falls, beginning Tuesday, June 18, with headquarters at the International Hotel. All who wish to secure rooms should apply to Mr. A. H. Gluck, Manager, International Hotel, Niagara Falls, N. Y.

The *Master Car-Builders' Association* will hold its next annual convention at Saratoga Springs, N. Y., June 25. Hotel accomodations may be secured by applying to H. S. Clement, Manager Congress Hall.

The Association of American Railway Accounting Officers will hold its next meeting at Niagara Falls, N.Y., in July.

The Traveling Passenger Agents' Association will hold its next meeting in Plank's Hotel, Mackinac Island, Mich., July 9.

The Roadmasters' Association of America will hold its seventh annual convention at Denver, Colo., Sept. 10.

The New England Roadmasters' Association will hold its next meeting in Boston, August 21.

The National Association of General Passenger and Ticket Agents will hold its next semi-annual meeting in Atlanta, Ga., Sept. 14.

The *National Association of Railway Surgeons* holds its annual convention in St Louis, Mo., May 2, 1889.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Gerard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7.30 p. m. at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p m. on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

American Railway Master Mechanics' Association.

Mr. Charles Blackwell, having resigned from the Central of Georgia, answers to circular on driver brakes should be addressed care of Angus Sinclair, Secretary, 140 Nassau street, New York city.

Association of North American Railroad Superintendents.

The seventeenth meeting of the association will be held at 46 Bond street, New York city, on Monday, April 8, 1889, at 11 o'clock A. M. A full attendance is particularly requested, as it is expected that matters of great importance will be brought up affecting the work and organization of the association. A cordial invitation is extended to all railroad superintendents to attend this meeting, and solicit others to attend, and, if not members, to present their applications for membership.

Engineers' Club of St. Louis.

At the regular meeting of March 22, Vice-President Nipher was in the chair, and 37 members and 2 visitors were present. Messrs. O. E. Hovey, A. L. Johnson and Herman Krutzsch were elected members.

Professor Nipher addressed the club on Plans of Investigations in Dynamo Designing, illustrating his remarks by drawings and formulæ. He gave two empirical formulæ for the safe carrying capacity of wire in ampéres.

Prof. J. B. Johnson made a brief reply to Prof. Nipher's discussion of the paper on cable yokes. He held that the proper way to provide resistance to the closing of the slot is by increasing the strength of the conduit, and that if the strength could be greatly increased by a new form of yoke, without added expense, this is the proper thing to do. Mr. Holman called attention to the great amount of cable construction in prospect and the importance of this question of the best form of yoke.

Mr. Holman explained a new method of making large pipe connections to water mains without interrupting the flow of water, which is available for pipes as large as 12 in. in diameter.

Western Railway Club.

The regular monthly meeting of the club was held Tuesday, March 19, at its rooms in the Phœnix Building, Chicago, President Rhodes in the chair. No papers were presented, but discussion on the subject of an axle for 60,000-lb. cars was continued from the last meeting. The subject of draw-bar rigging for freight cars was also discussed. Abstracts of these discussions appear elsewhere in this issue. The President stated to the club that the Scarritt Furniture Co. had presented to the club a chair for the president's use, and a vote of thanks to the company was passed.

Western Society of Engineers.

The 256th meeting of the Society was held Wednesday evening, March 6. Mr. E. C. Carter in the chair.

Messrs. Edwin G. Nourse, James Knox Lyons, Chas Cruft Brokaw and Ricard O'Sullivan Burke, proposed at last meeting, were elected to membership.

Mr. C. F. Rossiter, of the Committee on Standard Drawing Papers for Engineers, reported as follows:

"As one of the committee appointed to see what could be done towards inducing manufacturers of profile and cross-section paper to furnish engineers with translucent paper for blue printing purposes, I will report that by correspondence I learn that one of our manufacturers will not try the experiment under any circumstances, and the other reports that profile paper can be made on thin bond paper, but it would be expensive, stating that sheets 21 × 33 in. will cost 75 cents. Believing that this price is exorbitant, there being no reason in my mind for charging more than the retail price for sheet profile paper, I have had experiments made for lithographing profile paper, and have succeeded beyond my expectation. The lines in this copy are too heavy, but can be reduced in the next. Blue prints taken from the bond and vellum cloth, printed in blue and green inks, give satisfactory results. Sample sheets are submitted herewith for inspection. My experimental sheets are only 10 × 12, but when satisfied that there will be a call for such paper, I will have an engraving prepared 21 × 33, which I am satisfied I can furnish at 30 cents per sheet for bond paper, and about 60 cents for vellum cloth.

Mr. Rossiter introduced some samples of profile paper, which had been prepared for blue printing, and explained his experiences.

The Secretary briefly called attention to the benefits to be derived from the appointment of an active committee to provide professional entertainment and matter for discussion by the society at its regular meetings. Mr. A. F. Nagle spoke of the Topical Questions which had afforded much experience to the American Society of Mechanical Engineers, and coincided with the views of the Secretary. Mr. Carter called attention to the actual work of the Western Society of Engineers not being adequate to its condition, indorsed the proposition and urged that the matter should be brought up at the next meeting. Mr. Wm. S. Bates moved that a plan be formulated to provide papers and discussions at next meeting.

As the hour was late the paper "On the Croton Valley Storage," by Samuel McElroy, was ordered to be read at next meeting.

PERSONAL.

—Mr. George H. Benjamin, of New York, has severed his connection with the Consolidated Coupling Co. as its counsel in patent matters.

—Mr. G. W. Coddington, Superintendent of the Visalia division of the Southern Pacific, died at Tulare, Cal., March 15, at the age of 64.

—Mr. Charles L. Dunham, Superintendent of the Union Depot at Kansas City since 1884, has resigned to enter the service of another company.

—Mr. W. B. Halstead, formerly General Passenger Agent of the Ohio Valley road, and more recently General Freight and Passenger Agent of the Indiana Midland, has resigned that position.

—Mr. A. H. McCulloh, formerly General Passenger Agent of the Cumberland Valley, died in Chambersburg, March 21, aged 76 years. He had been in the service of the company for 35 years, but retired in 1886.

—Mr. George F. Evans, who has represented the Eames Vacuum Brake Co. for the last three years, has resigned his position with that company and has become connected with the McElroy Steam Heating Co., of Albany, N. Y., of which he will hereafter be a representative.

—Mr. John Scott, President and one of the Receivers of the Allegheny Valley Railroad, died March 21 of pneumonia, at the age of 69. He was prominently identified with a large number of financial and industrial institutions in Pittsburgh, was formerly President of the Pittsburgh, Virginia & Charleston, and a director of the Pennsylvania, and was one of the originators of the Edgar Thomson Steel Co.

— Mr. Clayton E. Gill, who has been General Freight Agent of the Grand Rapids & Indiana road for four years, has resigned that position to become Chairman of the Freight Classification Committee, with office in New York, May 1. Mr. Gill has been connected with the traffic department of railroads since Oct., 1868, when he entered the service of the New York, Lake Erie & Western as a clerk in the office at Warsaw, N. Y., where he was born in 1850. Since 1869 he has been connected with western roads.

—The Postmaster General, on recommendation of the General Superintendent of the Railway Mail Service, has appointed the following Division Superintendents: W. H. Bigelow, First Division, Boston, Mass., vice George E. Dame, resigned; R. C. Jackson, Second Division, New York City, vice W. F. Doolittle, resigned; C. W. Vickery, Third Division, Washington, D. C., vice Eugene Carrington, resigned; L. M. Terrell, Fourth Division, Atlanta, Ga., vice B. M. Turner, resigned; George W. Pepper, Ninth Division, Cleveland, O., vice F. B. Dodge, resigned. With the single exception of Mr. Pepper, the appointees named above have heretofore held the same offices, having been displaced during the last four years.

—Several important changes have been recently made in the Traffic Department of the Atchison, Topeka & Santa Fe system. The authority of W. F. White, Traffic Manager, has been extended over the Chicago, Santa Fe & California, and he now holds that position on all the lines controlled by the Atchison, Topeka & Santa Fe, as well as on the main line proper. Mr. S. B. Hynes, who has been connected with the traffic department of the Atchison, Topeka & Santa Fe and its controlled lines since he entered railroad service, and who has lately been General Freight Agent of the road, has resigned that position on account of failing health, but will remain in the company's service as General Freight and Passenger Agent of the California lines. He has been succeeded in the former position by Charles A. Parker, who has been Assistant General Freight Agent since May, 1887. Mr. Parker entered railroad service in 1881 as a freight clerk on the Atchison, Topeka & Santa Fé, and has since remained with that road, with the exception of about a year, when he served as Commercial Agent of the Mexican Central. The resignation of Mr. Emmons Blaine as General Freight Agent of the Chicago, Santa Fé & California, created a vacancy which has been filled by the appointment of F. C. Gay, now Assistant General Freight Agent of the Atchison at Kansas City.

ELECTIONS AND APPOINTMENTS.

Alabama Midland.—O. R. Whitney, Superintendent of Motive Power, announces the appointment of E. C. Spalding as Car Accountant of the road, with headquarters at Atlanta, Ga. Mr. Spalding was formerly Car Accountant of the Western & Atlantic.

Atchison, Topeka & Santa Fe.—The following changes and appointments have been made, taking effect April 1:

S. B. Hynes having resigned his position of General Freight Agent of this company to accept other service in the system, C. A. Parker has been appointed to fill the vacancy thus made.

J. G. Miller having resigned his position as General Agent at St. Louis to accept other service in the system, N. T. Spoor has been appointed to fill the vacancy thus made.

C. R. Hudson has been appointed Division Freight and Passenger Agent, with headquarters at Las Vegas, New Mexico.

F. C. Gay having been appointed to the position of General Freight Agent of the Chicago, Santa Fe & California, A. P. Tanner has been appointed Assistant General Freight Agent of this company and the Chicago, Santa Fe & California, with headquarters in Board of Trade Building, Kansas City, Mo., to fill the vacancy thus made.

The office of the Traffic Manager has been removed from Topeka to the Rialto building, Chicago, and the jurisdiction of W. F. White, Traffic Manager, has been extended over the Chicago, Santa Fe & California and Gulf, Colorado & Santa Fe roads.

Atlantic City.—The following officers of the consolidated company have been elected: Austin Corbin, President; Albert Foster, Secretary, and William A. Church, Treasurer.

Bangor & Piscataquis.—A. G. Wakefield, L. J. Morse, John Cassidy and Charles L. Marston, Edward B. Neally, Charles B. Stetson, B. B. Thatcher, Isaac Strickland and A. M. Robinson have been elected directors for the ensuing year.

Belleville & St. Louis.—The incorporators of this Illinois company are: Edward L. Thomas, Henry M. Needles and John T. Taylor, of Belleville; Alpheus Booling, of Breed's Station, St. Clair County; John S. Hill, of East St. Louis; and Burt S. Adams, of St. Louis.

Black River Falls & Eastern.—Hugh H. Price, Dudley J. Spaulding and Warren C. Jones, of Black River Falls, Wis. are the incorporators of this company.

Boston & Maine.—The office of Master of Maintenance of Way of the western division has been abolished, and the maintenance of road, bridges and buildings, on the western division, will hereafter be under the charge of the Chief Engineer. The western division, road department, will be under three roadmasters, E. A. Smith, E. W. Lydston and E. Morrill, who will report direct to the Chief Engineer.

Broken Bow & Western.—The following are the incorporators of this Nebraska company: John C. Manlick, Jesse Gandy, M. Reyner, George W. Sturtevandt and Willis Caldwell.

Buffalo, Lackawanna & Pacific.—The following are the directors of this New York company: Neil Woodward, J. S. Smith, Brooklyn, N. Y.; J. Richardson, Charles J. Pierson, J. D. Ripley, New York; R. F. Goodman, John E. McIntire, Charles M. Howe, Pascal P. Pratt, James R. Smith, George B. Mathews, Buffalo, N. Y.; William Rockwell, Brooklyn, N. Y.; Charles B. Gaskill, Niagara Falls, N. Y. The following officers have been elected: President, Joseph Richardson of New York; Vice President, James R. Smith, Buffalo; Treasurer, C. B. Gaskill, Niagara Falls; Secretary, C. M. Howe, Buffalo; General Manager, Col. J. E. McIntire, Buffalo.

California Central and California Southern.—H. B. Wilkins having resigned his position as General Freight and Passenger Agent of these companies, to accept other service in the system, S. B. Hynes has been appointed to fill the vacancy.

Chesapeake & Ohio.—Col. Charles B. Childe has been appointed Consulting Engineer of the Cincinnati Division, with headquarters in Cincinnati, O.

Chicago, Milwaukee & St. Paul.—D. P. Frisby has been appointed Northwestern Passenger Agent in St. Paul, to succeed Frank B. Ross, resigned.

Chicago & Ohio River.—J. D. Livingston has been appointed General Manager of the company, with headquarters at Kansas, Ill.

Chicago, Santa Fe & California.—Emmons Blaine having resigned his position of General Freight and Passenger Agent of this company, to accept service with another line, and C. A. Parker having been promoted to another position in the service of the system, the following appointments to fill these vacancies have been made: F. C. Gay to the position of General Freight Agent and J. G. Miller to the position of Assistant General Freight Agent, both with headquarters Rialto Building, Chicago, Ill.

Cincinnati, Alabama & Atlantic.—The following have been elected directors: M. R. Campbell, W. R. French, Tullahoma, Tenn.; H. K. Bryson, W. C. Morgan, Fayetteville; W. D. L. Record, Lynchburg; James A. Jones, Woodbury.

Columbus & Cincinnati Midland.—The company has elected the following directors: Henry Miller, T. Ewing Miller, Charles Parrott, G. C. Hoover, James Wilcox, Orland Smith, S. Spencer, George Headley, James Watson.

Denver, Rocky Mountain & Western.—The incorporators of this Colorado company are: Lafayette Seaman, Thomas I. Wiswall, Frank Duggan, Julius C. Dedisse and Jasper D. Babcock.

Flint & Pere Marquette.—T. E. Borden has been appointed Cashier, with office at East Saginaw, Mich.

Hornellsville & West Union.—Irvin W. Near, Harlo Hakes, Charles Adsit, E. F. Willetts, George N. Orcutt, Robert K. Faulkner, A. F. Prindle, Franklin D. Sherwood, De Melville Page, Murray E. Page, Floyd McConnell and Charles A. Dolsen, all of Hornellsville, N. Y., compose the first board of directors of this company.

International & Great Northern.—E. M. Alvord has been appointed Purchasing Agent, with office in Palestine, Tex.

Jacksonville, Tampa & Key West.—M. R. Moran, General Superintendent, having resigned, J. A. Larnerd, General Freight Agent, will, until further notice, act as Superintendent in addition to his other duties, with headquarters at Jacksonville, Fla.

Jeffersonville & New Albany.—The incorporators of this Indiana company are W. N. Marshall, W. H. Fogg, Paul Reising, Oscar A. Clark and Solomon Jacobs, all of New Albany, Ind.

Junction.—The directors have appointed Robert W. Smith, Treasurer of the Pennsylvania, to be Treasurer, and John C. Sims, Jr., Secretary of the Pennsylvania, to be Secretary of the Junction road, to succeed Robert J. Craven, removed.

Kanawha & Ohio.—L. D. Button has been appointed General Superintendent, with office in Charleston, W. Va.

Kansas City, Lawrence & Nebraska.—The following are now the officers: President, Howard M. Holden, of Kansas City; Vice President, J. M. Webster; Secretary, John E. Jewett; and Treasurer, J. N. Van Hoesen, all of Lawrence, Kan., and Chief Engineers, Breithaupt & Allen, of Kansas City, Mo.

Kansas City, St. Joseph & Council Bluffs.—The annual meeting was held in St. Joseph, Mo., recently and the following officers were elected: President, C. E. Perkins; Vice-President and Treasurer, J. C. Peasly, Chicago, Ill.; Second Vice-President, H. B. Stone; Secretary, A. G. Stanwood, Boston, Mass.

Kensington & Tacony.—The following directors have been elected by the company, a branch of the Pennsylvania: J. N. Du Barry, John P. Green, N. P. Shortridge, W. L. Elkins, Henry D. Welch, Amos R. Little and Samuel Rea.

Kentucky Central.—At the recent annual meeting the following directors were elected: I. E. Gates, George Bliss, H. E. Huntington, Gen. Sam. Thomas, Elliott Pendleton, M. E. Ingalls and Calvin Brice.

Long Beach & San Pedro.—The annual meeting of the company was held March 13, and the following directors were elected: Charles W. Eldrige, James Campbell, John W. Green, H. E. Cornwall, all of Los Angeles, and C. L. Stevenson, of Salt Lake City. The officers elected are: James Campbell, President; H. E. Cornwall, Vice-President; J. W. Green, Secretary & Treasurer.

Meigs Elevated.—The incorporators of this company are: Benjamin F. Butler, J. V. Meigs, Henry Dobbins, John P. Wyman, Jr., Joseph H. O'Neil, Franklin E. Gregory, Albion C. Drinkwater, William S. Butler, William A. Russell, Mark H. Frank, T. W. Pierce, George E. Harrington, Henry Hastings, Nathan Appleton, George A. Alden, John Brewster, Walter S. Swan, A. C. Woodworth, Frank Jones, Charles Babbidge, Charles H. Whiting, Edward E. Floyd, and Thomas W. Clarke. Joseph H. O'Neil, President, and Franklin E. Gregory is Treasurer.

Mexican Central.—Edward A. Whorf has been appointed Assistant to the General Manager, and David Mackenzie has been appointed Superintendent of the Tampico Division, with office at Tampico, Mex.

Midland (Indiana).—W. B. Halstead, General Freight and Passenger Agent, having resigned, the duties of that position will hereafter be performed by H. Moore, Receiver. William Trissell has been appointed Trainmaster.

New Orleans & Gulf.—The following directors and officers were re-elected at the annual meeting held in New Orleans last week: Directors, Lloyd R. Coleman, John R. Elder, John Dymond, Lucas E. Moore, Edward C. Elder, M. R. Spelman, B. S Story; President, John R. Elder, of Indianapolis, Ind.; Vice President, Lloyd R. Coleman; Secretary and General Manager, M. R. Spelman; Treasurer, Lucas E. Moore; Attorney, Hon. E. D. White.

New York & New England.—C. B. Phelps has been appointed Train Master of the Western and Springfield divisions, and B. R. Pollock, Jr., has been appointed Chief Train Dispatcher.

Ohio & Mississippi.—G. W. Stevens having resigned the position of Purchasing Agent to engage in other business, J. Alfred Barnard has been appointed to succeed him as Purchasing Agent, with office at Cincinnati.

Pennsylvania.—At the annual meeting this week the old board of directors were re-elected, as follows: George B. Roberts, Wistar Morris, Alexander M. Fox, Alexander Biddle, N. Parker Shortridge, Henry D. Welsh, William L. Elkins, William Thaw, H. H. Houston, A. J. Cassatt, C. A. Griscom, B. B. Comegys, Amos R. Little.

Polk & Forty-ninth Street Junction.—The directors of this new Chicago road are George B. Reeve, Frank H. Culver, Frederick A. Howe, William J. Spicer and Elijah J. Merdough.

San Francisco & North Pacific.—The following are the officers of the consolidated company: President, James M. Donahue; Vice-President, F. F. Low; General Manager, H. C. Whiting; Chief Engineer, F. K. Zook; General Passenger & Ticket Agent, Peter J. McGlynn; General Freight & Baggage Agent, Charles Thorn, Jr.; Secretary and Auditor, Thomas Mellersh; Superintendent, W. G. Corbaley; Master Mechanic, E. Reynolds; Roadmaster, P. Hyde. The general office is at San Francisco, Cal.

Seattle, Lake Shore & Eastern.—The company announces the following changes: John Craig has been appointed Auditor, vice F. A. Allen, resigned to become General Passenger and Freight Agent, vice W. J. Jennings, resigned. J. F. Shephard has been appointed Assistant Treasurer, vice F. A. Allen resigned.

South Florida.—At the annual meeting held in Sanford, Fla., the following directors were elected: H. B. Plant, B. F. Newcomer, E. B. Haskell, H. M. Flagler, W. S. Chisholm, J. E. Ingraham and H. S. Haines. J. E. Ingraham was re-elected President; E. B. Haskell, Vice-President, vice R. M. Pulsifer, deceased; B. R. Swoope, Superintendent and Purchasing Agent, Sanford, Fla.; Wilbur McCoy, Auditor and General Freight and Ticket Agent; C. C. Haskell, Treasurer, Sanford, Fla.

Suncook Valley.—Hiram A. Tuttle, of Exeter, N. H., has been chosen President, to succeed Samuel N. Bell, deceased.

Tennessee Midland.—At the annual election held at Memphis, Tenn., March 21, the following directors and officers were elected: A. S. Buford, T. C. Leake, Jr., R. H. Temple, R. L. Traylor, Richmond, Va.; E. R. Richardson, Nashville; John Overton, Jr., D. T. Porter, T. J. Latham and James H. Allen, Memphis. John Overton, Jr., Memphis, President; T. C. Leake, Jr., Richmond, Va., Vice-President, and R. H. Temple, Richmond, Chief Engineer.

Union Pacific.—R. W. Baxter has been appointed Train Master of the first district, with headquarters at Council Bluffs, Ia., vice J. A. Foley, who has been appointed Train Master of the Lincoln, Manhattan and Stromsburg districts, with headquarters at Beatrice, Neb.

S. F. Rhodes has been appointed Superintendent of the company's stone quarries at Stout and Buckhorn, with headquarters at Stout, Col., to take effect April 1. He will have direct supervision of the operations of the quarries, including the loading of stone upon cars ready for shipment. J. H. Stafford has been appointed General Storekeeper, with headquarters at Omaha, Neb.

OLD AND NEW ROADS.

New Companies Organized.—Atlantic City.—Belleville & St. Louis.—Buffalo, Lackawanna & Pacific.—Brazos Terminal.—Denver, Rocky Mountain & Western.—Hornellsville & West Union.—Jeffersonville & New Albany.—Terre Haute & Southeastern.

Alabama Midland.—The survey to Ada, on the Northwest & Florida road, over which line this company secures an entrance to Montgomery, has been completed, and grading will soon commence on this 30-mile section. Tracklaying on the 33 miles of the road in Georgia from Bainbridge to the Chattahoochee River at Gordon, Ala., will be completed by April 15. The grading has been nearly all completed to Ozark, Ala., 81 miles from Bainbridge, and it is expected to have the entire line to Montgomery opened by Sept. 15 next, in time to secure the fall business. The road is being laid with 60-lb. steel rail, and equipment has already been delivered as follows: Locomotives, 14; passenger cars, 19; freight and other cars, 338. The company has $2,625,000 common stock, and $1,600,000 preferred stock, all of which has been sold or subscribed to secure the construction of the road. The cost of the road and equipment to date has amounted to $725,000, and it is estimated that the completed road will cost $3,000,000; this includes the purchase of the Northwest & Florida. The company has individual grants and subscriptions to the extent of $600,000, and a state grant of $24,000. It has authorized an issue of $2,800,000 six per cent. first-mortgage gold bonds, payable in 1928, but of this authorized issue, only $495,000 is outstanding. The Metropolitan Trust Co., of New York, is the trustee of the bonds. O. C. Wiley, of Troy, Ala., is President. The principal office is at Montgomery, Ala.

Arkansas.—The legislature has passed bills extending for two years the charters of the following railroads: The Little Rock & Alexandria, the Arkansas & Louisiana, the Mississippi Valley, the Memphis, Arkansas & Texas, the White & Black River Valley, the Kansas City, Arkansas & New Orleans, the Little Rock & Choctaw and the Mountain View.

Atlantic City.—The Philadelphia & Reading branch lines in New Jersey were this week merged and consolidated into one corporation under the title of the Atlantic City Railroad Company. The roads merged were the Philadelphia & Atlantic City, the Williamstown & Delaware River, the Glassboro Railroad, the Camden, Gloucester & Mount Ephraim, the Kaighn's Point Terminal, and the Kaighn's Point Ferry Co. The main lines of these roads aggregate about 76 miles. Since the new management of the Philadelphia & Reading assumed control of that company's properties extensive improvements have been made to the Philadelphia & Atlantic City road. The roadbed has been strengthened, and all of the heavy grades and several curves have been removed. The entire main line from Camden to Atlantic City has been covered with cinder ballast. Arrangements have been completed for further extensive improvements in the roadbed and increased facilities to accommodate the constantly growing traffic on the Atlantic City line, which is to be double-tracked the entire length, 54 miles, from Camden to the seashore. The Bethlehem Iron Co. has contracted to furnish the company 7,000 tons of 76-lb. steel rails, to be delivered after July 1 next. In the meanwhile the bed of the road will be widened and the ties laid to receive the second track.

Designs for a new station at Atlantic City have been prepared, and the work of its construction will begin shortly. It will be two stories in height, constructed of brick and ornamental wood work; the interior of the general waiting room will be 50 by 50 ft. When the new station is completed the present passenger depot will be converted into an additional freight house. There will be two separate tracks for the incoming and two for the outbound passenger trains, and two additional tracks immediately adjoining the old passenger station will be used for excursion trains. The freight tracks will be entirely separated from those for passenger service.

Baltimore & Delaware Bay.—It is stated that the Central of New Jersey will assume control of this road on the expiration of the present lease in May, and that it will relay the line with steel rails and make extensive repairs to the road, add new rolling stock, and build an extension west about seven miles to Tolchester, on Chesapeake Bay. This would give a line from the Chesapeake Bay to Delaware Bay at Bombay Hook, from which point connection is made at Bayside, on the eastern side of the bay, with the New Jersey Southern division of the Central of New Jersey, large floats being used to transfer the cars. The line passes through a productive fruit region, and it is expected to deliver freight, shipped during the day, in Jersey City and New York early the following morning.

Beaver Falls & Western.—The company has been chartered in Pennsylvania with a capital stock of $150,000, to build a road 15 miles long, extending from a point on the Pittsburgh & Western, in Wayne township, Lawrence County, to Rochester, Beaver County.

Belleville & St. Louis.—This company has filed a charter in Illinois to build a road from Belleville, northwest about 12 miles to East St. Louis. The line, if built, would parallel several existing roads. Capital stock is placed at $50,000.

Birmingham, Jackson & Kansas City.—Citizens of Jackson, Tenn., have applied for a charter authorizing the building of a line from Jackson, Tenn., through Dyersburg, Tenn., to Tiptonville, on the Mississippi River, and thence to Kansas City. An extension is also contemplated from Jackson, Tenn., to Birmingham, Ala.

Black River Falls & Eastern.—This company has been organized in Wisconsin to build a road from Black River Falls easterly to Tremont and Alva, connecting with the Green Bay, Winona & St. Paul. The distance is about 25 miles, and the principal office will be at Black River Falls.

Bowling Green & Northern.—The locating survey is now being made for this road as rapidly as possible, and it is expected to let contracts by May 1. The road is to be built from Bowling Green, Ky., north to a point on the Chesapeake, Ohio & Southwestern, a distance of 40 miles. A line is also to be built from Bowling Green southeast to Scottsville, on the Chesapeake & Nashville, a distance of 25 miles. M. H. Crump, of Bowling Green, is Secretary.

Brazos Terminal.—The charter of the company has been filed at Austin, Tex., authorizing the building of a line from Velasco to Quitman, Tex., near the mouth of the Brazos River. The capital stock is $500,000.

British Columbia.—The Provincial Legislature has passed a bill granting a cash subsidy and a large land grant for the construction of a line of railroad on the Island of Vancouver from the terminus of the present road north to the end of the island.

Broken Bow & Western.—This company has been chartered in Nebraska to build a road from Broken Bow, Custer County, westerly through the counties of Custer, Loup, Valley, Garfield, Greeley, Boone, Wheeler, Holt, Knox, Logan, Lincoln, Keith, Perkins and Cheyenne. The capital stock is $3,000,000.

Buffalo, Lackawanna & Pacific.—This company has been incorporated in New York with a capital stock of $250 000, to construct a road from the International Bridge, in the city of Buffalo, to the Suspension Bridge, in the village of Suspension Bridge, Niagara Co., N. Y., a distance of 22½ miles. It is thought that by the construction of this line the Canadian Pacific will get an entrance into Buffalo, which the newspapers generally credit it with earnestly desiring.

Cairo, Vincennes & Chicago.—The General Manager is quoted as declaring untrue the reports which state that this line will be included in the new company which is to be formed by the consolidation of the Cleveland, Columbus, Cincinnati & Indianapolis and the Cincinnati, Indianapolis, St. Louis & Chicago, the final arrangements of which are now being made. He states, however, that the negotiations for the sale or lease of the road to the Pennsylvania are still pending.

Canada & St. Louis.—The company has filed amended articles of incorporation in Indiana, providing for the construction of a line, 35 miles long, from Goshen, Ind., to a connection with the Pittsburgh, Fort Wayne & Chicago road in Marshall County. The capital stock is $500,000.

Cape Girardeau Southwestern.—The extension from the connection with the St. Louis, Iron Mountain & Southern at Williamsville, Mo., westerly 23 miles to the connection with the Current River road at Hunter, Mo., has been completed. This branch connects with the main line at Wappapello, Mo., and that section of it from that point to Williamsville, 20 miles, was completed last fall.

Central Arkansas.—The company has been chartered in Arkansas to build a line from Pine Bluff southeast to Hamburgh, Ark., about 100 miles, and thence to Monroe and New Orleans, La. The capital stock is $2,260,000.

Central of New Jersey.—Whitney & Burke, of Philadelphia, have received the contract for double-tracking the Lehigh & Susquehanna division from Mauch Chunk to Wilkesbarre, Pa., 54 miles. The work will be commenced early next week.

Centreville, Moravia & Albia.—In the Federal Court at Keokuk, Ia., March 25, Judge Love discharged Thomas Thatcher as receiver of the road, and turned over the railroad property to the purchasing committee, Russell Sage, William H. Gebhardt and Charles W. Opdyke. The line extends from Relay to Albia, Ia., 26 miles.

Chattanooga, Rome & Columbus.—Some time ago this company was voted a subscription of $200,000 by the city of Chattanooga to aid it in building its road. By a recent decision of the Supreme Court, this subscription will have to be declared invalid, as the law under which it was authorized and voted, did not give the requisite power. A bill has been introduced in the Legislature to authorize the city authorities to again submit the question to a vote of the people.

Chicago, Santa Fe & California.—The case of Price, McGavock & Co. for Jones, Forrest & Bodkin against the Company was decided by Judge Blodgett of the United States Circuit Court, at Chicago on March 25, adversely to the company. Price, McGavock & Co. built the road from Galesburg to the Mississippi, and sublet the contract to Jones, Forrest & Bodkin, who sublet it in divisions to other contractors. At the conclusion of the work the Chief Engineer of the road caused the whole work to be remeasured and reclassified, cutting down the last monthly estimates of the resident engineer for one division about $25,000. Jones, Forrest & Bodkin had in the meantime paid their sub-contractors according to the engineer's estimates, and the company refused to make good the amounts so paid out. The court found that the company was liable to the extent of the overpayments and for certain extras.

Cincinnati, Alabama & Atlantic.—What is announced as the final locating survey for this road, was commenced last week at Huntsville, Ala., and will be continued northwest to Tullahoma, Tenn., the present proposed northern terminus. It is claimed that grading will be commenced at Huntsville the latter part of April or early in May.

Cleveland, Cincinnati, Chicago & St. Louis.—The directors of the Cleveland, Columbus, Cincinnati & Indianapolis this week voted in favor of the consolidation of that road with the Cincinnati, Indianapolis, St. Louis & Chicago. The agreement will now be voted on by the stockholders of both companies at their annual meetings in May. The two companies will form a new company, to be called the Cleveland, Cincinnati, Chicago & St. Louis, with $10,000,000 preferred stock and $20,500,000 common stock. The preferred stock will be exchanged at par for shares of the Cincinnati, Indianapolis, St. Louis & Chicago, which will also receive $3,000,000 of the common stock, and the balance of the common stock, $17,500,000, will be given to the holders of Cleveland, Columbus, Cincinnati & Indianapolis stock, who will receive $116.66 in new stock for every $100 Bee Line stock held by them.

Cleveland & Marietta.—A suit has been begun in the Common Pleas Court of Franklin County, at Columbus, O., by Theodore F. Davis, of Marietta, Ohio, against Isaac Morton, of Columbus, and

Cyrus W. Field and John Paton, of New York, who were the Purchasing Committee for the bondholders of the Pittsburgh, Marietta & Cleveland road, now the Cleveland & Marietta. The suit is for the purpose of compelling the Purchasing Committee to report its transactions in transferring the properties of the Pittsburgh, Marietta & Cleveland to the Cleveland & Marietta. The suit will also involve the title to the property.

Darien Standard Short Line.—Work will be commenced on this road within 30 days. The line will be 100 miles long, of which 40 miles is already graded, and the trestles completed, ready for tracklaying. The line will be laid with 60 lb. steel rails. If the Savannah, Americus & Montgomery builds its proposed extension to Savannah, this line will connect with it at Reidsville, Tattnall County. It will pass through a fertile and well timbered part of Georgia. William Varnedoe, of Darien, McIntosh County, is General Manager.

Denver, Rocky Mountain & Western.—This company has been chartered in Denver to build a road from Denver southwesterly to Morrison and Mount Evans. The capital stock is placed at $1,000,000.

Denver, South Park & Pacific. — The bondholders' committee has perfected a plan for the reorganization of the company. It is proposed to sell the property under foreclosure of the first and consolidated mortgages and to organize a new company, which will issue new bonds at the rate of $11,000 a mile and $3,000,000 new stock. The plan contains these other provisions: The Union Pacific owns $3,589,000 of the $3,717,000 outstanding consolidated bonds of the company, and in settlement all claims held by it, including moneys advanced, amounting to $2,000,000 and upward, the Union Pacific will receive the $3,000,000 capital stock of the new company and agrees to deliver bonds to be made by the Union Pacific amounting to $3,245,400, maturing 30 years after date, bearing interest at the rate of 4½ per cent. per annum. These bonds will be placed in trust and used in settlement with first mortgage bondholders, and in payment of foreclosure and reorganization expenses, and in future betterments on the property of the new company. The $3,602,394 bonds to be issued by the new company will be delivered to the New England Trust Co., of Boston, as collateral security to the $3,245,400 Union Pacific bonds. The settlement with first mortgage bondholders involves an exchange of the bonds now held by them for the Union Pacific collateral trust bonds, dollar for dollar, past due and unpaid coupons to be adjusted by payment therefor in cash of $22 50 for each $35, or upon the basis of 4½ per cent. interest per annum on principal from May 1, 1888, to date of new bond. No assessment will be made upon bondholders under the agreement proposed.

Gulf & Ship Island.—It is expected to resume work on this Mississippi road in a few days. The road is now in operation from Gulfport north about 16 miles, and grading has been finished north as far as Hattiesburg. Tracklaying on this graded section will be completed soon after the work is resumed. Capt. W. H. Hardy is President.

Hartford & Connecticut Western.—The new owners of this road, who are largely interested in the Poughkeepsie Bridge and the connecting roads to it, are meeting with considerable opposition from the city of Hartford to the consummation of some of their plans. They propose to build an 18-mile branch north from Tariffville, Conn., to Springfield, Mass., and Hartford claims that the construction of this branch would make that city a way station and Springfield the terminus, and this is done despite the fact that Hartford gave a subscription of $750,000 originally to secure the building of the main line, while Springfield refused to subscribe anything. The company is also applying to the Connecticut Legislature to give it power to issue $2,500,000 of new bonds, $750,000 to be used to build the Springfield branch and $550,000 to be used in improving the old road and in purchasing new rolling stock. The stockholders in Hartford and along the road object to this new issue of bonds, and have petitioned the Legislature to refuse to allow the company to issue them.

The Boston *Journal*, speculating on the prospects of this road and the through line from the coal fields to New England, adverts to the disadvantage of having the eastern terminus as far west as the Connecticut River, and states that an extension from Hartford, Conn., northeastward to Worcester, Mass., is contemplated. It is claimed that funds for this purpose are obtainable, but no definite information is given. The route would be through Rockville and Stafford, Conn., and Wales, Brimfield, Sturbridge, East Brookfield, Spencer and Leicester, Mass. This would be a costly route to build, and would closely parallel the Boston & Albany for half the distance.

Hornellsville & West Union.—This company has been organized in New York to build a road commencing at the intersection of the New York, Lake Erie & Western with the route adopted by the Rochester, Hornellsville & Pine Creek road running thence southerly through the towns of Hornellsville, Canisteo and Greenwood to a point on said route, in the town of West Union where the same is intersected by the line adopted by the Coudersport, Hornellsville & Lackawanna, a distance of 16 miles.

Housatonic.—The Committee on Railroads of the Massachusetts Legislature this week continued the hearing on the petition of the Housatonic for incorporation in Massachusetts, with permission to purchase the roads now leased in Pittsfield County. The New York, New Haven & Hartford objected to the clauses of the bill which define the capital of the road at $3,155,000, which might be taken to give the road rights to build 30-mile branches in Connecticut. After a discussion these clauses were stricken out by agreement between counsel, and a bill presented that does not define the amount of capital, and makes the consent of Connecticut necessary before the authority to build in Connecticut can be exercised.

Houston, East & West Texas—There have been filed in several counties in Texas, copies of a mortgage executed to secure an issue of five per cent. 40 year bonds at the rate of $18,000 per mile to replace the old bonded indebtedness and for improvements to the road. The road is now in a receiver's hands, and a suit for foreclosure to protect the bondholders, is pending.

Interoceanic.—The contract for building the section from Rinconada southeast to Jalapa, in the state of Vera Cruz, has been let to S. Heaton and W. T. Robertson. The whole line from the City of Mexico to Vera Cruz is now under contract. Work is in progress on the section from Vera Cruz to Jalapa, and will soon be begun on the section from Jalapa to Rinconada. It is expected to complete the road from Vera Cruz to Jalapa within a year. The heaviest work on the line will be on the section from Rinconada to Peroti, which Read, Campbell & Co., of the City of Mexico, are building.

Jeffersonville & New Albany.—Articles of incorporation have been filed in Indiana by this company, which proposes to build a line from Jeffersonville, Ind., to New Albany, Ind., a distance of about 4 miles. The route will run along the line of the river, and it is expected that it will be in operation by Sept. 1. The capital stock is $60,000.

Lincoln Park & Charlotte.—Bids for grading this extension of the Buffalo, Rochester & Pittsburg will be received until April 2. The road is to extend from Lincoln Park Station, near Rochester, to Charlotte on Lake Ontario. About 100,000 tons of earth will have to be moved, most of it by dump cars, with a long haul. The work is to be completed by June 1. The contract for the pile and trestle bridges, aggregating over two miles in length, has been awarded to Col. J. E. McIntyre, of Buffalo. Bids for grading should be addressed to William E. Hoyt, Chief Engineer, Rochester, N. Y.

Louisville, Hardinsburg & Western.—The contract for building the entire line from Irvington, Ky., to Hardinsburg, Ky., has been let to Morris & Meyer, of Louisville, Ky., and work will be begun at once.

Manitoulin & North Shore.—The Ontario government has given this company a cash subsidy of $3,000 per mile for the proposed road from the village of Little Current to a connection with the Canadian Pacific at Nairn, Ont., 28 miles distant.

Meigs Elevated.—This company has secured a charter in Massachusetts to build a road from Harvard Square, Cambridge to Bowdoin Square, Boston. The capital stock has been fixed at $200,000, or not less than $100,000 a mile for every mile to be costructed in Cambridge as a part of the road. Ten per cent. of the stock has been paid in.

Memphis & Charleston.—The Chancery Court at Birmingham, Ala., last week granted an injunction restraining the stockholders of the East Tennessee, Virginia & Georgia from voting the stock of the Memphis & Charleston road. This will terminate the lease held by the former company, and the minority stockholders of the Memphis & Charleston road will now ask for the appointment of a receiver. The stockholders of the East Tennessee, Virginia & Georgia road obtained a slight majority of the stock of the Memphis & Charleston road and voted a lease of the road. The minority stockholders some time ago filed a petition asking for an injunction in the Chancery Court of the Northern Division of Alabama. Judge Cobb sustains the points in the petition, basing his decision on the same ground as did Judge Baxter at Knoxville in a recent decision against the Richmond & West Point Terminal Co. The suit is also pending in the Federal Court, which has not yet rendered a decision.

Mexican Central.—The company has completed 64 kilometres of the 114 on the line from Salinas to San Luis Potosi. On the line from Tampico grading has been finished to Tamasopo, and tracklaying is in progress.

Mexican Pacific.—The company has commenced the construction of its road at La Puerta, on the Pacific Coast, working toward Tonalá, in the state of Chiapas. James C. Oliphant, of Tonalá, is Chief Engineer.

Mexican Roads.—The Mexican National Construction Co. is to receive from the government of the state of Zacatecas a subvention of $1,500 per kilometre of road built within the state on the line from Zacatecas easterly to Ojo Caliente, in the state of San Luis Potosi. Work is in progress on this line. A like subvention is given for the construction of a line from Zacatecas to a connection with the Mexican National at Montezuma or some other point. The state government also grants the company a subvention of $2,500 for every kilometre built within the state, on a line from Zacatecas southerly to Guadalajara, on a branch of the Mexican Central. The surveys are nearly completed on the line from Zacatecas to Montezuma, and will soon be begun on the line to Guadalajara.

Montana & Canada.—This company has been incorporated in Montana to build a line from a connection with the proposed Calgary, Alberta & Montana at the international boundary, about 10 miles west of the Sweet Grass Hills, south to Conrad, on the Marias River, thence to Fort Shaw and Helena, an estimated distance of 180 miles.

New Roads.—B. I. Ward, W. N. Hart and others, of Winona, Miss., are interested in a project to build a road from Vicksburg to Winona, a distance of about 100 miles.

New Westminster, Southern & Billingham Bay.—The contract for grading the section from Whatcom, Wash. Ter., north to the international boundary, has been let to McCormick & Co., of Whatcom. This makes 44 miles of the road under contract. The section from New Westminster, B. C., south, was let some time ago to James Learry, of New Westminster. The line from Whatcom south to Seattle, 90 miles, is surveyed, and the contract for construcing it will probably be let by April 15. C. M. Sheafe, of Seattle, is General Manager.

Norfolk & Carolina.—Tracklaying was commenced on this road at Drivers, Va., on March 10, and the work will be pushed rapidly to the Chowan River, a distance of 37 miles. From the Chowan River southwest to the Roanoke River, 27 miles, the road is completed, and grading is still in progress on the section of 23 miles from the Roanoke River to Tarboro, N. C., where the line connects with the Wilmington & Weldon.

Northern of California.—A new mortgage in favor of the Union Trust Co., of New York, on the properties of the Northern Railway Co. of California is being recorded in California. This company is a consolidation of the Southern Pacific branch lines in northern California, and the mortgage is to secure the recently authorized issue of $21,000,000 five per cent. 50 year bonds, which is to take the place of old bonds recently called in.

Northern Michigan.—The survey for this line has now been completed from Houghton southwest to Watersmeet, Mich., a distance of 78 miles, and the contract for building the line will probably be let in April or May. Charles S. Robinson, of Hancock, Mich, is Chief Engineer.

Oneonta & Richfield Springs.—The survey for this road has now been completed from Oneonta, north through Laurens to Richfield Springs, N. Y., a distance of 32 miles. The right of way has not yet been secured, but committees are now securing it, and it will soon be all obtained. A. C. Couch, of New York, is President.

Oregon Railway & Navigation Co.—Tracklaying is in progress on the Pleasant Valley branch in Washington Territory, and nearly 20 miles of road has been completed. When finished this branch will be 48 miles long. Work is also in progress on the line across the Cœur d'Alene Indian Reservation in Idaho, for which Kilpatrick Bros. & Collins, of Beatrice, Neb., have the contract. This line was completed last year from Farmington, W. T., northeast to Rockford, 34 miles, and 87 miles now remain to complete the line from Rockford, W. T., to Mullan, Idaho.

Parry Sound Colonization.—This company has been organized to build a road from Parry Sound southwest to Burk's Falls, a distance of 40 miles, and has been granted a cash subsidy of $3,000 per mile of road built.

Petaluma, Sebastopol & Russian River.—The surveys for this California line are nearing completion, and the contracts for grading, rails, rolling stock, etc., will probably soon be let. The road will be standard gauge, and it is to extend from Petaluma, northwest to Sebastopol and the Russian River, about 40 miles. Further extensions into Mendocino County are also contemplated. J. A. McNear, of Petaluma, is President.

Philadelphia & Reading.—It is stated that if $80,000 is subscribed to the increased capital stock of the Northeast Pennsylvania road, by the residents along the line, the proposed extension from the present terminus at Hartsville, to New Hope, Pa., on the Delaware River, a distance of 16 miles, will be built. The extension, it is estimated will cost over $200,000, but the directors announce that they will begin work as soon as the $80,000 is subscribed and paid in. It is stated that the plan for a junction road by which the Baltimore & Ohio was to make a connection with the New York division of the Philadelphia & Reading has been abandoned.

Pittsburg, Shenango & Lake Erie.—It appears that it is this company which has secured options on dock property at Erie, Pa., and not the Baltimore & Ohio, as the first dispatches stated. If this last statement is confirmed, it would seem that the company has abandoned the proposed dock and harbor improvements at Conneaut, Ohio, and will make Erie the Lake Erie terminus of its extension from Amasa, Pa.

Polk & Forty-Ninth Street Junction.—Articles of incorporation have been filed in the office of the Secretary of State of Illinois. The capital stock is placed at $1,000,000, and the principal business office is to be in Chicago. The officers are Chicago & Grand Trunk men.

Portland & Willamette Valley.—The company now surveying a line from Oswego, Ore., to Oregon City, a distance of seven miles, and bids for constructing it will be asked within a month.

Red River, Sabine & Western.—The locating survey on this Texas road has now been completed for a distance of 20 miles from San Augustine and the preliminary line has been run for 35 miles. The contract for building the whole 35 miles has been let to Jas. Ratican, of Fort Worth, and the work is to be completed by Oct. 1 next. F. H. Tucker, of San Augustine, Tex., is Secretary.

Roanoke & Southern.—The section from Winston north to Walnut Cove, N. C., 18 miles, for which Griffin & Gordon, of Yorkville, N. C., have the contract, will be completed early next week. Work is in progress on the line from Walnut Cove north to Martinsville, Va., a distance of 43 miles, which is being built by Breen, Feely & Newby, of Martinsville, Va. Twenty-nine miles of this section is in North Carolina and 14 miles in Virginia. The road is being laid with 56 lb. steel rails. The survey has been completed from Martinsville to Roanoke, Va., 55 miles. C. W. Pearson, of Salem, N. C., is Chief Engineer.

St. Paul, New Ulm & Southwestern.—The preliminary survey of this road is now made from Hopkins, near Minneapolis, southwest through Carver and New Ulm to Lakefield, on the Chicago, Milwaukee & St. Paul, a distance of 125 miles. It is expected to let contracts and commence grading on a section of this line during the summer. N. C. Bredenhagen, of Carver, Minn., is President.

San Antonio & Aransas Pass.—The company has let the contract for grading the extension from Comfort to Fredericksburg, Tex., and work will be immediately commenced at Comfort. This line has been surveyed to Llano.

Salt Lake & Eastern.—L. A. Wakefield, of Sioux City, with a party of 20 surveyors, last week commenced the final location from Sioux City west. It is stated that the company is about to close contracts for building the first division of the road.

San Francisco & North Pacific.—The following railroads having been merged into one company, are to be known hereafter as the San Francisco & North Pacific Railroad Co.: San Francisco & San Rafael, San Francisco & North Pacific Railroad, Marin & Napa, Sonoma Valley road, and the Cloverdale & Ukiah road.

Scranton & Forest City.—For some time past this company has been doing some grading in Scranton, Pa., and, as already stated, contracts will be let next week for building the road from Scranton northeast to Forest City, about 20 miles; the survey between these points is now about completed. The line as located, parallels the Delaware & Hudson Canal Co.'s road between these points, and that company is endeavoring to obstruct, delay and, if possible, prevent the building of the Scranton & Forest City. In several places the surveyed line of the latter road runs through the yards of the Delaware & Hudson Canal Co., and that company has begun laying side tracks in these yards, to prevent the building of the Scranton & Forest City road. In Carbondale, an injunction was obtained to put a stop to the work, but despite it, the work went on. The Scranton & Forest City claims that it cannot gain an entrance to the city unless it passes through the yards.

Sonora, Sinaloa & Chihuahua.—Richards, Klegg & Co., of Ottawa, O., have a contract for building 220 miles of this line from Guaymas, Mex., the southern terminus of the Sonora road, along the coast of the Gulf of California, to Topolobampo Bay. The work will be commenced by April 15, and will be vigorously prosecuted. The contract includes rails, iron bridges, and the complete construction of the road. We published most of this information in our issue of March 15, under the title "Topolobampo."

Temiscouata.—The company has surveyed a branch from Edmunston, N. B., where the line connects with the New Brunswick road southwest to the confluence of the St. Francis and St. John Rivers, a distance of 36 miles. It is only intended, however, to complete 20 miles of this line, to Fort Kent, this summer.

Tennessee & Ohio.—The preliminary survey for the proposed extension from Rogersville, Tenn., easterly to Big Stone Gap, Va., a distance of 55 miles, has been completed. F. W. Carnahan, of Rogersville, is Superintendent.

Tiffin & Fremont.—Grading will be resumed on this road, this or next week. The work will not be let out to contractors, but will be finished by forces employed by the company. The road is surveyed from Marble Head, on Lake Erie, southeast to Upper Sandusky, a distance of 65 miles; of this 24 miles have been cleared ready for grading to commence. J. G. Kaney, of Toledo, Ohio, is Chief Engineer.

Union Pacific.—The directors decided at their meeting this week that it would be unwise to resume the payment of dividends in view of the unsettled condition of the railroads of the West. It appears that the Union Pacific had earned during the year 1888 about $2,400,000, which had been reduced by about $800,000 through the failure of the St. Joseph & Grand Island road, the Oregon Railway & Navigation Co. and the Central Branch to earn their fixed charges, the money to meet which the Union Pacific had advanced. About

$1,000,000, was used to meet the government requirements under the Thurman act, the total interest upon the government debt being some $1,200,000, so that to provide full interest upon that debt there is $1,200,000 to be taken from the $1,600,000 left after the charges noted above. This leaves only $400,000 for dividend purposes from 1888 earnings. The February statement shows decreased gross earnings of $172,179, making the net earnings $77,186 less than in February, 1888. The net earnings for the month were $500,785 upon a mileage of 4,816 miles, an increase of 111 miles. For January and February, 1889, the net earnings were $1,021,881, a gain of $94,896 over the same months of 1888.

Contractors are looking over the proposed extension of the Cheyenne Northern with a view to bidding on the work. It is proposed to extend the line from the present northern terminus at Wendover, Wyo., northerly to Fisher, a point about 15 miles southeast of Douglas, and on the Fremont, Elkhorn & Missouri Valley road. The distance is about 32 miles.

Utah & Arizona.—The contract will be let next month for building this road, which is to extend from Chester, the terminus of the San Pete Valley Road, south to Manti, Utah, 17 miles. The survey has been completed. Theodore Bruback, of Salt Lake City, is President.

Utah Central.—At a meeting of the stockholders of the road in Salt Lake City this week, it was voted unanimously to extend the line from Milford, 100 miles to the Nevada line, there to connect with a road which is to be built to Los Angeles. It was also voted to build branches to the Kanarerah and Castle Valley coal fields, each of which are distant 70 miles from the main line. By the construction of these roads enough coal can be shipped to supply the entire South Pacific coast. The Union Pacific will convert its Utah & Nevada branch to a standard-gauge line. The directors of the road last June also voted to extend the road southwest to the Nevada line. There is no intention of building the road at present.

Virginia, Kentucky & Tennessee.—The company announces that work will shortly be begun on a road from the western terminus of the Danville & New River road, in Patrick County, Va., westerly through Virginia into eastern Kentucky. A construction company has been organized to build the road. James Pierce, of Wytheville, Va., is President.

TRAFFIC AND EARNINGS.

Inter-state Commerce Commission.

Summonses to appear at the adjourned meeting on export rates at Washington, April 2, have been sent to all the prominent roads south of the Potomac and the Ohio River.

The Commission has ordered the Grand Trunk to appear in Washington April 4, to answer charges of violating the Inter-state Commerce law by giving rebates and special rates on shipments from points in the United States to points in Canada.

The Commission, by Commissioner Morrison, rendered its decision March 22 in the case of the Northwestern Iowa Grain & Stock Shippers' Association, against the Chicago & Northwestern. It states that a railroad company making different rates for the same distances on different branches of its road must justify them by showing that there is a difference in the cost of carrying on the different branches. The company by long maintaining a rate without the presence of competition on other than equal terms, makes or gives evidence that such rate is not too low. A company which has two routes between points cannot lawfully charge more for a shorter than a longer distance on either. A road can carry freight from points on its main line cheaper than another road can carry over a branch road with separate equipment to and over its main line, and where one of such branch lines must carry in competition with another road from its main line stations the rate on that branch establishes no criterion for the branches not so situated. The company gave special rates to corn shippers in Nebraska to a point in Illinois, by means of which the corn reached the seaboard at low through rates. When the company denied, as it did, such special advantages to corn shippers in Iowa, it gave unlawful preference to Nebraska shippers.

In the case of the Michigan Congress Water Co. against the Chicago & Grand Trunk, the Commission has decided that a railroad company cannot be required to haul a tank car loaded with Congress water when the car is in an unsafe condition to be transported; that the evidence shows no illegal combination or efforts on the part of the railway company. The petition was dismissed.

The Commission, in an opinion by Commissioner Schoonmaker, has decided the case of the Imperial Coal Co. and others against the Pittsburgh & Lake Erie and another. The points are as follows:

The rate on transportation of coal to points on Lake Erie has been grouped since April 1, 1887, for a considerable district in Western Pennsylvania, of which Pittsburgh is the centre. The district has a radius of forty miles around Pittsburgh. The group rate on coal is 90 cents a ton from all the mines and by all the lines of railroad that carry to the lake. The coal from the Pittsburgh district is in competition at the lake with coal from the Hocking Valley district, in Ohio, where the coal rate is also grouped at 85 cents a ton.

The complainant's mines are near the centre of the Pittsburgh District, and some mines within the radius are nearer the lake and others are more distant, varying from a few miles to 43 miles. On complaint for unjust discrimination against the complainants and undue preference to the more distant mines, it is held that a group rate to put producers of coal of the same general character and of practically like cost of production in a given territory on a footing of equality in reaching a common market among themselves and with competitors from another territory, is not unlawful unless it results in actual undue prejudice to producers nearest the market. The question of undue prejudice is one of fact to be determined upon all the evidence, including the character of the mines, the quality of the coal, the expense of reduction, the extent and nature of the competition, the public interests arising from the use of the commodity, and not merely by the fact of distance. On the facts of this case, which involves only the question of discrimination between the complainants' mines and the more distant mines in respect to lake shipments, it does not appear that the complainants are subjected to undue prejudice, or that the more distant mines are given an unreasonable preference by the uniform rate.

A decision was filed on March 25 in the case of the Little Rock & Memphis against the St. Louis, Iron Mountain & Southern, and the East Tennessee, Virginia & Georgia. It is to the effect that while under the present English legislation the Little Rock & Memphis would undoubtedly be admitted to participate in through passenger business between points east of Memphis and points west of Little Rock at through rates, and while it was apparently the intention of Congress to incorporate the substance of the English law in this respect into the third section of the act to regulate commerce, nevertheless, in failing to provide the necessary machinery for the formation of the through route and the apportionment or division of the through rate, Congress has left this part of the third section practically inoperative without co-operation on the part of the carriers themselves. Recommendations for an amendment to the law designed to meet this difficulty were made in the second annual report of the Commission, and those recommendations are renewed.

Traffic Notes.

Chairman Faithorn has notified the lines in the Western and Northwestern divisions of the Western Freight Association that the proposed reduction of rates between Omaha and Duluth has been postponed by the Chicago, St. Paul, Minneapolis & Omaha, pending a decision under the rules of the Inter-state Commerce Railway Association.

The Kansas Railroad Commissioners have decided that the Union Pacific must receive cars from the Atchison, Topeka & Santa Fe at Abilene to be hauled to and from elevators, mills, etc., located alongside the tracks of the Union Pacific in that town. The Union Pacific had claimed that the law requiring it to receive cars from connections applied only to cases where the haul on its own road was from one station to another, and not to those where the service was merely switching.

The mass meeting of passenger men, called for March 27, at Cincinnati, has been postponed to April 2, and will be held in connection with the regular quarterly rate meeting. The first regular semi-annual meeting of the National Association of Passenger Rate and Division Clerks will be held at the same time and place, and it is desired that all rate and division clerks now members of the association or desiring to become such be in attendance.

The Transcontinental Association has discontinued the rule permitting holders of round-trip excursion tickets to the Pacific Coast to change the return route on payment of $10.

The Nickel Plate Fast Freight Line's general offices are to be removed from Rochester to Buffalo about April 14. The office has a clerical force of about 30 men.

General Passenger Agents' Meeting.

The American Association of General Passenger and Ticket Agents, at its meeting in New York City last week, received and referred to its executive committee a recommendation presented by the Association of Accounting Officers, to the effect that, as the adoption by all roads in the country of standard colors for coupon tickets would produce unnecessary confusion in the assorting offices, it was desirable that the General Passenger Agents' Association adopt for use on tickets an arbitary number for each road in the association. A road selling a ticket would print its own number on the back of each coupon, and on the face of each the number of the road expected to honor the ticket. The Accountants also urged the discontinuance, as far as possible, of issuing exchange tickets or orders, and the adoption of uniform rules for handling prepaid orders.

On the question of reporting to foreign roads all sums collected for extra baggage, Secretary Smith had made inquiry by circular, and had received answers from only 131 roads out of over 500, many prominent lines making no response. Of the lines answering, 101 are now reporting to other roads in accordance with the rules of the Association; eight report to lines that report to them; 14 will report if others do; one does not check except to junctions; one will adopt the system; one has no excess collections, and five do not check to other lines.

Central Traffic Association.

Chairman Blanchard has called a meeting of the managers of all the roads in the territory of the Association for April 3, to receive and act upon the final report of the committee appointed some time ago to revise the agreement of the association. The proposed agreement, it is understood, will be practically the same as that recently adopted by the trunk lines. It is stated that the vacancy caused by the resignation of George H. Daniels will not be filled, and that the office of vice-chairman will be abolished.

Earnings of South Carolina Roads.

The monthly returns of the railroads in South Carolina for January have been published. Of the 29 roads in the state 17 show an increase and nine a decrease in gross earnings. The increase is, $81,327, or 11.46 per cent. The total earnings for the month were $790,610, against $709,288 for January 1888. The Richmond & Danville shows an increase of $19,340, or 5 per cent. The South Carolina shows gross receipts for the month of $134,588, an increase of $7,011, or nearly 5 per cent.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, March 23, amounted to 55,696 tons, against 68,016 tons during the preceding week, a decrease of 12,320 tons, and against 56,829 tons during the corresponding week of 1888, a decrease of 1,133 tons. The proportions carried by each road were:

	W'k to Mar. 23.		W'k to Mar. 16.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	4,924	8.9	5,777	8.5
Wabash	4,846	8.7	5,766	8.5
Lake Shore & Michigan South.	5,212	9.4	6,498	9.5
Pitts., Ft. Wayne & Chicago	5,940	10.7	6,590	9.7
Chicago, St. Louis & Pitts.	6,130	11.0	8,287	12.2
Baltimore & Ohio	3,271	5.9	3,317	4.9
Chicago & Grand Trunk	13,260	23.8	16,817	24.7
New York, Chic. & St. Louis	4,443	7.8	5,888	8.7
Chicago & Atlantic	7,670	13.8	9,076	13.3
Total	55,696	100.0	68,016	100.0

Of the above shipments 3,307 tons were flour, 22,031 tons grain, 2,698 tons millstuff, 3,776 tons cured meats, 2,468 tons lard, 7,380 tons dressed beef, 1,679 tons grass seed, 737 tons butter, 1,481 tons hides, 106 tons wool, and 6,132 tons lumber. The three Vanderbilt lines carried 26.1 per cent. of all the shipments, while the two Pennsylvania lines carried 21.7 per cent.

Coal.

The coal and coke tonnage of the Pennsylvania, originating on lines east of Pittsburgh and Erie, for the week ending March 16, and the year to that date, was as follows:

	Coal.	Coke.	Total.
Total for week ending March 16	208,257	83,454	291,711
Total for year 1889 to date	2,200,264	943,136	3,143,400
Total for year 1888 to date	2,453,326	830,638	3,283,964

The anthracite coal tonnage of the Belvidere division of the United Railroads of New Jersey division for the same periods was as follows:

	1889.	1888.	Inc.
For week ending March 16	27,857	17,704	I. 10,152
For the year 1889 to date	282,630	328,624	D. 45,994

The Cumberland coal trade for the week ending March 23, amounted to 20,477 tons, and for the year to that date 597,907 tons.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows.

ALLEGHENY VALLEY.

Month of February:				
Gross earnings	$162,609	$156,350	I.	$6,259
Oper. expenses	95,714	89,621	I.	6,093
Net earnings	$66,895	$66,729	I.	$166
Two months—Jan. 1 to Feb. 28:				
Gross earnings	$331,678	$311,506	I.	$20,172
Oper. expenses	193,402	177,491	I.	15,911
Net earnings	$138,276	$134,014	I.	$4,262

NEW YORK, LAKE ERIE & WESTERN.

Month of February:				
Gross earnings	$1,711,177	$2,048,280	D.	$337,103
Oper. expenses	1,128,701	1,438,982	D.	310,281
	$582,476	$609,298	D.	$26,822
Less proportion due leased lines	159,681	167,803	D.	8,122
Net earnings	$422,795	$441,495	D.	$18,750
Five months—Oct. 1 to Feb. 28:				
Gross earnings	$10,599,885	$11,111,516	D.	$511,631
Oper. expenses	6,968,190	7,449,517	D.	481,408
	$3,631,775	$3,661,999	D.	$30,223
Less proportion due leased lines	945,721	990,213	D.	$44,492
Net earnings	$2,686,054	$2,671,785	I.	$14,269

NORTHERN CENTRAL.

Month of February:	1889.	1888.	Inc. or Dec.	
Gross earnings	$435,191	$454,751	D.	$19,560
Oper. expenses	312,921	307,180	I.	5,741
Net earnings	$122,270	$147,571	D.	$25,301
Two months to Feb. 28:				
Gross earnings	$899,940	$907,192	D.	$7,252
Oper. expenses	628,152	631,374	D.	3,222
Net earnings	$271,788	$275,818	D.	$4,030

Month of February:	1889.	1888.	Inc. or Dec.	P.c.
Balt. & Ohio	$1,472,717	$1,481,643	D.	$8,926 0.06
Net	308,680	348,796	D.	40,116 12.9
Cleveland & Canton	30,030	26,370	I.	3,660 13.8
Net	8,562	6,465	I.	2,097 32.4
Det., Bay C. & Alp	41,347	34,726	I.	6,621 19.0
Net	20,055	12,558	I.	7,507 60.4
Ill. Central	1,047,147	915,468	I.	131,679 12.5
Net	380,047	230,805	I.	149,242 64.7
Staten Island Rap. T.	43,808	41,569	I.	2,239 5.3
Net	2,496	2,680	D.	184 7.3
Summit Branch	99,494	121,719	D.	22,225 22.3
Net	31,365	18,500	I.	12,865 53.3
Lykens Valley	63,752	94,773	D.	31,031 48.6
Net	11,638	2,443	I.	9,195 ...
W. Va. Cent. & Pitts.	54,114	36,737	I.	17,377 47.3
Net	15,988	13,497	I.	2,491 18.4
Total (gross)	$2,852,409	$1,853,005	I.	$999,404 53.9
Total (net)	778,831	635,704	I.	143,127 22.5
Month of January:				
*Atch., Top. & S. F.	1,979,175	.....		....
Net	387,914	314,137	I.	73,777 23.4
Chic., Bur. & Quincy	1,916,205	1,671,294	I.	244,911 14.6
Net	453,879	378,643	I.	75,236 19.8
Lines controlled	548,421	470,799	I.	77,622 16.4
Net	156,071	143,648	I.	12,423 8.6
Cin., Jack. & Mack.	43,217	33,036	I.	10,181 30.8
Net	3,958	.....		....
Gr. Rapids & Ind	162,605	146,353	I.	16,252 11.1
Net	51,868	25,491	I.	26,377 103.0
Mexican Central	495,156	512,042	D.	16,886 3.4
Net	210,314	253,310	D.	42,996 20.4
Total So. Pac. Sys.	3,514,772	3,246,765	I.	268,007 8.2
Net	870,032	932,476	D.	62,444 7.1
Total (gross)	$6,637,150	$6,047,253	I.	$589,906 9.7
Total (net)	1,742,164	1,733,568	I.	8,596 .49

*Includes operated lines and lines in which Atchison has one-half interest.

Cotton.

The cotton movement for the week ending March 22 is reported as follows, in bales:

Interior markets:	1889.	1888.	Inc. or Dec.	P.c.
Receipts	36,047	20,532	I.	15,515 75.5
Shipments	55,689	28,448	I.	27,241 95.7
Stock	195,628	276,960	D.	81,332 41.5
Seaports:				
Receipts	84,273	38,380	I.	45,893 119.
Exports	133,203	63,948	I.	69,255 108.
Stock	633,320	740,700	D.	107,380 16.9

Anthracite Coal Shipments.

Mr. John H. Jones, Chief of Bureau of Anthracite Coal Statistics, furnishes the following statement of anthracite coal tonnage for the month of February, 1889, compared with the same period last year:

Month of February:	1889.	1888.	Inc. or Dec.	
Phila. & Reading	356,686	214,314	I.	142,372
Lehigh Valley	*444,249	334,316	I.	109,933
Central of N. J.	334,470	361,064	D.	26,593
Del., Lack. & W.	296,499	624,301	D.	327,802
Del. & Hud. Canal Co.	262,446	419,102	D.	156,656
Pennsylvania	253,260	348,434	D.	95,173
Pennsylvania Coal Co.	55,416	157,380	D.	101,964
N. Y., L. E. & W.	94,633	69,408	I.	25,224
Total	2,097,662	2,528,322	D.	430,660
From Wyoming Region	1,096,683	2,021,973	D.	925,290
" Lehigh " "	449,874	52,250	I.	397,624
" Schuylkill " "	551,104	454,098	D.	97,005

*Approximated.

The following is the statement for the year 1889, compared with last year:

	1889.	1888.	Inc. or Dec.	
Phila. & Reading	905,375	308,785	I.	596,589
Lehigh Valley	984,172	632,351	I.	351,820
Central of N. J.	786,945	690,927	I.	96,017
Del., Lack. & West.	606,915	1,258,185	D.	649,270
Del. & Hud. Canal Co.	585,228	810,987	D.	225,759
Pennsylvania	529,966	665,296	D.	135,330
Pennsylvania Coal Co.	118,961	280,906	D.	161,944
N. Y., L. E. & W.	200,628	136,573	I.	64,054
Total	4,720,191	4,784,014	D.	63,823
From Wyoming Region	2,413,417	3,930,270	D.	1,516,853
" Lehigh " "	986,860	100,272	I.	886,587
" Schuylkill " "	1,319,914	753,471	I.	566,442

The stock of coal on hand at tide-water shipping points Feb. 28, 1889, was 837,216 tons; on Jan. 31, 1889, 807,314 tons; increase, 29,902 tons.

This statement includes the entire production of anthracite coal, excepting that consumed by employés, and for steam and heating purposes about the mines, but does not represent the entire anthracite coal tonnage actually transported by the respective roads, adjustment being necessary in the compilation to avoid duplications, etc.